South Florida Water Management District Contract CN040936-W005, STA-5 Flow-way 3 Draft Basis of Design Report

APPENDIX II

STA-5 Flow-way 3 DRAFT GEOTECHNICAL REPORT



April 19, 2005

38615334

South Florida Water Management District 3301 Gun Club Road West Palm Beach, Fl 33416-4680

Attn: Ms. Maria Clemente, PE

Re: WO# 01 Submittal

Draft Geotechnical Investigation Report

STA 5 FLOW-WAY 3 Contract CN040936

Dear Ms. Clemente,

Please find enclosed the above-referenced draft geotechnical investigation report for STA 5 Section 2. The scope of work has been completed in general accordance with our Work Order #2, Contract CN040936 dated January 12, 2005.

We trust this report is responsive to the District's needs. Should you have any questions regarding the report contents, please feel free to call us.

Respectfully Submitted, URS CORPORATION

Garfield L Wray, P.E. Senior Lead Engineer

Fernando Parra, Ph.D., P.E. Senior Engineer

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GEOTECHNICAL INVESTIGATION REPORT STORMWATER TREATMENT AREA (STA) NO. 6 EXPANSION HENDRY COUNTY, FLORIDA

1.0 INTRODUCTION

This report presents the results of the geotechnical investigation for the design of the STA-5 Flow-way 3 expansion. The purpose of the geotechnical investigation is to provide a comprehensive evaluation of the site conditions for the design of the canals and levee systems and related structures for the project. As earthwork represents a major component of the cost of construction, comprehensive assessments of the ground conditions were warranted in an effort to minimize proposed levee and canal sections as a cost savings measure to the project. Evaluation of the design to provide adequate factors of safety, as well as to provide for long term stability and ease of maintenance of the levees and canals, are also important goals of the project team and geotechnical assessment component. Our work was performed in accordance with our approved contract dated October 28, 2004.

2.0 SCOPE OF THE GEOTECHNICAL PROGRAM

The scope of the geotechnical program included performing a series of supplemental field exploratory borings and standard laboratory classification tests. Specifically, the scope of work of the geotechnical program included the following tasks:

- Mobilization of truck-mounted drilling equipment to the site.
- Supervision, drilling, sampling, and coring of 36 supplemental borings for the purpose of defining and classifying ground conditions along proposed levee and canal alignments, and in the vicinity of proposed control structures. Supplemental borings varied in depth from approximately 30 to 75 feet.
- Muck probing at about 100-foot intervals to further delineate the depth of near surface compressible peat deposits.
- Laboratory testing program to determine material classification and properties. Laboratory testing included index classification, compaction and soil corrosion.
- Engineering analyses of at least four levee/canal cross-sections for slope stability, levee settlement estimates, and seepage either into or out of the supply canal and treatment cell areas.
- · Preparation of the design report presenting the results of field borings and

laboratory testing, muck probing, and design analysis and evaluations, including development of levee and canal cross-sections for incorporation into project drawings and contract bid documents.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

3.1 SPT BORINGS

Subsurface conditions within STA-5 Flow-way Section were explored by drilling thirty six (36) Standard Penetration Test (SPT) borings, totaling 1,125 linear feet of drilling. In general terms, the exploration sites were located along the western, southern and eastern boundaries of the cell. The locations of the borings are shown on Plate 1. The plan shows also the locations of soil borings drilled previously by Nodarse & Associates. Thirty five of the URS borings were drilled to advanced 30 feet below grade while the remaining boring located on the north eastern corner was drilled to 75 feet below the existing ground surface. The borings were drilled using a mud (bentonite) rotary technique with a 3-7/8-inch diameter tricone roller bit powered by a Central Mine Equipment model 55 (CME-55) truck-mounted rig.

Sampling of the subsoils was basically by the Standard Penetration Test (SPT) method, which involves driving a 2-inch diameter split-spoon sampler a distance of 18 or 24 inches by repeated blows of a 140-lb hammer freely falling 30 inches (ASTM D1586). The hammer blows are counted and recorded and the SPT-N value computed as the number of blows required to advance the sampler between depths of six to 18 inches below the top of the drive. SPT sampling was generally performed continuously to a depth of 10 feet below grade, and at 5-foot intervals thereafter within the depths of each boring.

The completed boreholes were used to measure groundwater levels after completion of the boring and then filled with a neat cement grout.

Boring logs are presented in Appendix A of this report.

3.2 MUCK PROBES

The thickness of the surficial organic layer was measured by hand probing at accessible areas along the edges of existing cane fields. At the time of the initial work, the sugarcane fields were fully grown and probings were limited to the edges of the fields. The fields will be harvested by mid April 2005 after which a supplemental program will be implemented. At some probe locations, a 1/2-inch-diameter, pointed steel rod was pushed from natural ground surface to refusal at the top of the underlying rock (caprock) layer. The depth to refusal was recorded as the organic soil thickness. Alternatively, a hand auger or posthole digger was used to provide muck depth measurements. Locations and results of the muck probing are shown in the appendix of this report.

3.3 PIEZOMETER INSTALLATION AND FIELD PERMEABILITY TESTING

The in situ permeabilities of the substrata were measured by field constant head percolation tests. To run the field tests, six piezometers were installed. The locations of the piezometers are shown on Plate 1. The piezometers were constructed in the boreholes using 2-inch diameter Schedule 40 PVC riser pipe. Tests were run with five-foot and tenfoot sections of No. 10 slotted well screen. The annular space between the pipe and the borehole was filled with coarse concrete sand around the screen, and was sealed with grout and soil cuttings above the screen up to the ground surface. The well screen lengths and depths were selected in order to measure both shallow and deep permeability and also to characterize the permeability of individual subsoil layers (peat, caprock, sand, sand/ limestone). The permeability results were computed using the equations presented by The US Bureau of Reclamation. The field permeability test results are presented in Table 1 and are included in Appendix B of this report.

3.4 LABORATORY TESTING

Thre hundred and thirty three (333) split-spoon (jar) samples were collected in the field and taken to the laboratory. Each sample was visually inspected and classified, per the Unified Soil Classification System, by a geotechnical engineer. Select samples were then tested for physical, mechanical, and chemical properties.

The laboratory physical and mechanical testing included 103 moisture content, 25 Atterberg limits, 77 percent passing No. 200 U.S. Standard Sieve (12), six (6) organic content, and five (5) compaction.

In addition, to the physical testing, we also performed pH, chloride, and sulfate tests on 15 samples, and soil resistivity on 3 samples.

The physical and chemical laboratory test results are summarized in Table 2A and 2B, respectively.

4.0 SITE CONDITIONS

4.1 REVIEW OF EXISTING DATA

Existing reports and technical documents with geotechnical information for STA-6 and its vicinity were provided by the District for URS's review in performing this scope of work. These documents include:

1. Florida Geological Survey, Geological Map of Hendry County, Florida, 1993.

- 2. USDA, SCS, Soil Survey of Hendry County, Florida, December 1990.
- 3. U.S. Department of the Interior, Geology of the Western Everglades Area, Southern Florida. Florida Geological Survey, Circular 314, December 1954.
- 4. Brown and Caldwell, General Design Report, 30% Deliverable, Detailed Design Stormwater Treatment Area 2 and Water Conservation Area 2A Hydropattern Restoration, Contract No.C-E201, January 26, 1996.
- 5. Central and Southern Florida Project, Comprehensive Everglades Restoration Plan, B.2 Hydraulics, B2.2 Hydrologic Modeling/Methodology Report. Everglades Agricultural Area, Storage Reservoirs Phase 1. U.S Army Corp of Engineers, Jacksonville District, South Florida Water management District, Assisted by Kimley-Horn and Associates, Inc., January 2004.
- 6. Burns & McDonnell, Everglades Construction Project. Detailed Design Report. Stormwater Treatment Area No. 5 (STA-5), STA-5 Discharge Canal and STA-5 Outlet Canal, Volume I of II. March 1997.
- 7. Burns & McDonnell, Everglades Construction Project, Detailed Design Report, Stormwater Treatment Area No. 6 (STA-6), March 1997.
- 8. LJ Nodarse and Associates, Report of Subsurface Exploration and Geotechnical Engineering Evaluation, Stormwater Treatment Area 5 (STA-5), Everglades Treatment Area, Hendry County, Florida, November 5, 1996.
- 9. LJ Nodarse and Associates, Report of Additional Subsurface Exploration and Geotechnical Engineering Evaluation, Stormwater Treatment Area Number 5 and 6, Everglades Treatment area, Hendry County, Florida, May 30, 1997.

4.2 GEOLOGICAL SETTING AND SUBSOIL PROPERTIES FROM EXISTING DATA

Based on the information collected, we prepared a summary of general geology and subsoil profile and characteristics, as presented in the following paragraphs.

4.2.1 Surficial Soils

The soils survey of Hendry County indicates that the majority of the project site is underlain by organic soils. Organic surface soils and peats are formed primarily in shallow freshwater lakes or marshes that are inundated for much of the year. The growth, death and decay of marsh vegetation over thousands of years is responsible for the accumulation of thick deposits of organic muck or peat up to 10 feet in depth south of Lake Okeechobee. The principal vegetation that accounts for formation of peats in the Everglades is sawgrass. Historically, peat accumulation in the Everglades proceeded at a rate of about 3.3 inches every 100 years. By 1914, organic soil accumulations in the Everglades reached their maximum average thickness of 134 in (EIS, 1995).

In 1990, the Soil Conservation Service (SCS) (Beltz et al., 1978) mapped the Everglades agricultural areas (EAA) as part of a soil survey for Hendry County. The Everglades occupy a narrow curved slice of eastern Hendry County. Nine basic surficial soil types are recognized in the STA; Denaud muck, Gator muck, Terra Ceia muck, Pahokee muck,

Lauderhill muck, Dania muck, Plantation muck, Margate sand and Jupiter fine sand. Classification of these soils is largely based on soil properties and their depth to the limestone bedrock, with Terra Ceia representing the deepest soils (typically more than 48 in.) followed by Pahokee muck (between 36 and 96 in.) Lauderhill muck (between 20 and 36 in.) and Dania muck as the shallowest (less than 20 in.). According to the U.S. Department of Agriculture SCS mapping of Hendry County, issued December 1990, the project area is primarily (est. @ 85%) covered by muck soils at the surface. Surficial mucks thin out on the west side of the site and are deepest on the east side.

A summary of the surficial soils to be expected within the project area according to the Soil Survey of Hendry County is presented below:

SECTION	SOIL	NOTES
Northern side of	Plantation, Terra	Plantation and Dania Mucks: Peat interbedded
the cell	Ceia, Lauderhill	with black sand, overlying rock.
	and Dania Mucks	Terra Ceia and Lauderhill Mucks: Peat overlying
		rock
Western side	Myakka sand	Myakka sand: Uniform fine sand and silty sand.
	predominates.	Delray sand: Uniform fine sand overlying sandy
	Short sections in	clay, underlain by rock.
	Okeelanta muck	Okeelanta Muck: Peat overlying sand.
	and Delray sand,	
	depressional	
Southern edge	Immokalee,	Immokalee sand: Fine uniform sand.
	Myakka and	Margate sand: Fine uniform, underlain by rock
	Margate sands in	Pahokee Muck: Peat underlain by fractured
	western 7000ft	limestone.
	section, followed	Other soils types described above.
	by Plantation,	
	Lauderhill, Dania	
	and Pahokee	
	Mucks. Short	
	stretch in Jupiter	
	fine sand at the	
	center of the	
	section	
Eastern Side	Pahokee Muck	Soil described above.

4.2.2 Limestone Formations

The surface organic soils are generally underlain by the Fort Thompson formation of Pleistocene age, which has an average thickness of 15 feet, and consists of freshwater, marine and brackish-water limestones and marls. The Fort Thompson formation is underlain by the sandy, Tamiami Formation of Pliocene age, which is approximately 150 feet deep in the project area (C&SFP, January 2001). At the base of the Tamiami lie the relatively impervious beds of the Hawthorn formation. The Hawthorn formation of

Miocene age is 400 to 600 feet. thick in Hendry County and confines older artesian aquifers formed by the Tampa/St. Marks Limestone of Miocene age, the Suwannee Limestone of Oligocene age, and the Ocala Group and Avon Park Limestone of Eocene age. The Suwannee Limestone, Ocala Group and Avon Park Limestone form the Floridian Aquifer at depths of 600 to 1,800 feet below the surface.

4.2.3 Surface Conditions

The Everglades area is topographically flat with elevations generally less than 20 feet (NGVD). The ground surface generally slopes from north to south with an average gradient of 0.15 foot per mile (Parker et al., 1955). The highest ground elevations occur in the northern Everglades at 17 feet (NGVD). The lowest elevations occur in the southern Everglades at 0.3 to 1.0 foot (NGVD).

STA-5 Flow-way 3 section is located just west of the Palm Beach-Hendry county line. It is bordered by the L-3 Canal on the west and Rotenberger Wildlife Management Area immediately to the east, STA-5, Flow-way 2 to the north and the U.S. Sugar Corporation Unit 2 sugar cane farm to the south. Terrain elevations range from approximately 10 to 13 feet, NGVD. Higher elevations, on the order of 14 to 15 feet, NGVD occur near the western side of the cell. The area is dedicated to sugar cane production.

4.2.4 Subsurface Conditions

Based on the information in the borings, we have generalized the subsurface stratigraphy at the site as described in the paragraphs below.

Layer I: Fill – This layer consists of stiff, crushed limestone with silt, clay, shell and organic material. The material is classified as poorly graded sand with silt, silty sand, and clayey sand. The fill varies in thickness from approximately two to four feet. Thicker fills occur at the elevated existing levees. SPT N-values recorded in this layer range predominantly from six to 34 blows per foot (bpf) with an average value of about 18 bpf, indicating a layer that is loose to medium dense.

Layer II: Organic Silty and Clayey Peat — This layer consists of dark brown fibrous or organic silty and clayey fibrous peat. The peat layer is one to seven feet thick, averaging approximately 4 feet thick in the STA 5 borings. Moisture contents in the peats range from approximately 35 to 459 percent. Organic contents in this layer range between about eight and 79 percent. SPT N-values for the peat range predominantly from one bpf to 5 bpf, indicating a mostly soft to very soft stratum.

Layer III: Limestone and Calcareous Silt and Clay with Limestone Fragments - Underlying the organic soils, is silty and clayey limestone and sandstone, and calcareous silt and clay with limestone fragments, and shell and organics interbedded with silty and/or clayey sand. Fines content in the silty/clayey sands

is on the order of 10 to 30 percent. The natural moisture contents in the fine-grained soils range from 10 to 35 percent. The Atterberg Limits tests indicate liquid limits of predominantly 19 to 29 percent, with plasticity indices of three to ten percent. SPT N-values recorded in this layer range from two bpf to about 85 bpf with occasional refusal conditions. The average SPT N-value in this layer is about 12 bpf.

In general terms, shallow-lying limestone is not apparent in the south western and the western sides of cell 3 of STA-5. In these areas, other deeper limestone strata, covered by thick strata of clayey sand or clays, occur at depths that exceed 12 feet or so. Shallow limestone seems to prevail in the rest of the edges of STA-5, with the exception of local areas (case of borings CB0016, 20, and 33). At these particular sites, the profile within the explored depth of 30 ft consists predominantly of loose to medium dense clayey sands interbedded with soft clays.

Groundwater was reported at depths that range from approximately two to six feet, averaging 4 feet. Corresponding NGVD elevations range from approximately +6.5 to +13.5 feet, averaging about Elevation +10 feet NGVD.

Groundwater levels at the site fluctuate as the result of localized dewatering of site canals for agricultural activities at the site. The range of water tables reported during field investigation likely represents the lower range during the dry season and harvesting activities to the higher elevations typical of the wet season.

4.2.5 Design Physical Soil Parameters

Based on results obtained from the physical laboratory tests performed on representative borrow materials and soil samples and data from existing reports, we estimated design physical soil parameters for levee fill and subsurface layers at STA 5. These parameters are summarized in Table 3. For purposes of comparison, the parameters used for previous analyses at STA 2, STA 5, and STA 6 are presented in Table 4.

4.2.6 Results of Chemical Testing

Chemical tests comprising pH, sulfates and chlorides were performed on 15 samples. The results are presented in Table 2. The pH varies from a low (acidic) value of 4.7 to a high (basic) value of 8.4. Chloride and sulfate contents ranged from 90 to 120 and 60 to 108 parts per million, respectively.

Several factors are used as indicators of the corrosion potential of soil. These factors include soil pH balance, and concentration of sulfate and chloride ions. Generally, a pH less than seven (7) indicates an acidic soil environment that could be potentially corrosive to buried metal and concrete. Sulfate and chloride ion concentrations greater than about 1,000 and 300 parts per million (ppm) respectively indicate soil that is potentially corrosive to buried metal and concrete. Soil resistivity less than about 10,000 ohm-cm indicate soils that are potentially corrosive to buried metals. The results of chemical

testing indicate that the materials tested have a low potential for corrosion to buried metal and concrete based on pH, sulfate and chloride ion concentrations, and soil resistivity. Available corrosion protection measures include dielectric coating of metal pipes, cathodic protection for welded steel piping, and the use of ASTM Type II or Type IV cement for concrete. A corrosion engineer should be contacted for specific recommendations if needed.

5.0 DESIGN EVALUATIONS

5.1 GENERAL GEOTECHNICAL SITE SUITABILITY

The site is considered generally suitable for the proposed STA 5 Flow-way 3 expansion. The near surface soil conditions with the highly compressible organic soil (peat) at ground surface, present challenges to the anticipated earthwork construction and requires special considerations in both design and construction. The levees will be stable, but they will settle appreciably. Most of the settlement will occur relatively quickly, and will be compensated for by overbuilding of the levee height during construction. In addition to settlement issues for the constructed levees, the near surface weak peat soils and the high groundwater table could result in unstable driving conditions for heavy construction equipment.

5.2 LEVEE CONSTRUCTION MATERIALS ZONING PLAN

Levee designs must effectively utilize available onsite materials while maintaining adequate factors of safety against instability under proposed operating conditions over the life of the project. Effective utilization of existing onsite borrow fills from canal excavations is required to balance excavation quantities and to minimize earthwork construction costs.

The geotechnical design team has considered the details of the proposed construction and the results of the field investigations performed for this and previous studies. Construction of the proposed levee systems for STA 5 Flow-way 3 can be accomplished over the existing compressible peats provided the designs compensate for the anticipated peat settlement, and the long-term structural integrity of the levee foundation system is maintained. Levee construction over the existing peats is practical, as it will reduce construction costs by eliminating the need to excavate and replace these peat materials.

The levee design for this project proposes to use fill from the canal and borrow excavations resulting in a composite mixture of compacted peat, sand, and limestone. Obviously, the mixing of the insitu excavated materials must be controlled to maintain integrity of the levee fill material. It is recommended that the organic soils be mixed with the underlying interbedded limestone and sandy soils where the average peat thickness is less than three feet. Constructability reviews with earthwork contractors experienced with similar construction in the area, indicate that borrow/canal areas can be effectively and economically drilled and blasted where peat thicknesses are less than three feet

without removing the peats. Peat thicknesses greater than approximately three feet create access problems to drilling, blasting and materials excavation equipment, and the construction costs of working over such thicknesses increase significantly. On other STA sites, the peats in canal areas have been excavated to allow access for blasting.

Review of the field data indicates that significant portions of the site contain surface organic soil deposits with thicknesses of two feet or more. Correspondingly, to facilitate excavation activities and to comply with proposed borrow material mixing requirements, it will be necessary to strip off sections of peat and temporarily stockpile such material in non-levee areas. The stockpiled peats should be allowed to drain and subsequently wasted on the levee slopes as non-structural fill or used as levee cover to support vegetation growth or wasted in canal plug areas. Wasting of excess peat should be confined primarily to outboard slopes of a structural levee core along supply and discharge canals and along interior slopes of the treatment cells. Peats should not be wasted on interior levee slopes where canal flow conditions may transport buoyant peat masses to inflow/discharge control structures.

Levees will be constructed by placing fill in thick controlled lifts over a prepared peat surface. A layer of geogrid reinforcement will be required at or near the surface of thick peat layers to improve levee stability and integrity during consolidation of the underlying peats. Levees will be overbuilt to accommodate long-term consolidation of the underlying peats. The anticipated peat settlement is discussed below in Section 5.4.2

Based on previous computations and experience, we estimate shrinkages of 40 percent for the organic soils that are to be blended with limestone/sand mixes, and 66 percent for segregated (stockpiled) organic soils. The hard limestone will bulk during excavation and therefore a shrinkage factor of 5 percent is assigned to the granular materials (i.e composite limestone, silty/clayey sand).

5.3 SUMMARY OF ADOPTED DESIGN PARAMETERS

The key design parameters used in the seepage, slope stability, and settlement analyses are listed in Table 3. Selection of the parameters was based on our assessment of previous investigation in similar geological conditions, the recommendations of the reports by Burns & McDonnell for STA-5 and STA-6, and the results of our field exploration and laboratory testing performed for this investigation.

5.4 ENGINEERING ANALYSES, CONCLUSIONS, AND RECOMMENDATIONS

5.4.1 Seepage Analysis

Seepage quantities were estimated using the two-dimensional computer program SEEP2D developed by the US Army Waterways Experiment Station. This program uses

the finite element method to compute flows and heads for confined and un-confined plane and axisymmetric steady state seepage problems, given specific boundary conditions and material permeabilities.

A total of five representative cross-sections were evaluated for boring locations CB-12, CB-28, and CB-33, as well as TB-3 and TB-21 from previous exploration by Nodarse and Associates Each cross-sections consist of a seepage collection canal and accompanying levee. The estimated canal depth was 12 feet, with a bottom elevation of -2 feet NGVD, and a base width of approximately 8 feet. The assumed side slope for the canals is 3:1 (horizontal to vertical) within a depth of four feet below grade, and no steeper than 2:1 below that depth. Levee sections 8.5 and 10.5 feet high were analyzed. The crests of levees were conservatively set at elevation +20.5 and a levee crest width of 14 feet was used. Upstream and downstream levee side slopes of 3:1 were considered.

The headwater level was taken at Elevation +17 feet NGVD. The level was taken as the static water level (SWL) elevation, which approximately corresponds to Elevation +8, as per the levels detected at the boreholes selected for the analyses.

Flow though the upper organic soil takes place across the natural, uncompressed muck as well as through the muck that undergoes consolidation due to the embankment loading. The modeling incorporated the marked difference in permeability between the muck conditions cited.

The seepage analyses results are presented in Table 5. The computed seepage quantities range from about 1.5 to 11 cubic feet per day per foot of levee (cf/d-ft levee), with the lower values corresponding to subsurface profiles at CB-12 and CB-33 where muck was absent. This order of magnitude of seepage appears to be consistent with previous District experience for the ENR and STA 2. The diagrams indicate very little seepage occurring through the levee fill, with the majority of the flow being base seepage in the relatively permeable sands and limestones beneath the peat layer.

Flow nets and corresponding discharges are displayed in Appendix C of this report.

5.4.2 Settlement Evaluation

Settlement estimates are essential in determining the required overbuild of levees to compensate for short-term and long-term levee settlements associated with the presence of relatively thick layers of organic soils. An equation was developed which accounts for the levee height, peat thickness, and compressibility of peat and fill materials. The general settlement equation is shown below.

$$S = 0.03 (H+S) + 0.61 (T) log {[T+3.2 (H+S)]/T}.$$

The equation uses three percent of total height of levee and anticipated settlement to account for the internal compression of fill. The factor 0.61 is equivalent to a compression index of 6.7 assuming an initial void ratio of 10 for peat materials.

Settlement evaluations were conducted primarily using (1) existing laboratory consolidation test data, and (2) back-calculation of peat compression from soil borings, muck probes, and visual measurement of existing levee heights. Total settlements of levees include (1) secondary consolidation, (2) compression of fill, and (3) additional settlements resulting from overbuild.

For the secondary consolidation, the ratio of Ca/Cc (secondary to primary compression index) was assumed as 0.035 to 0.085 for fibrous peat (Holtz and Kovacs, 1981). The resulting secondary consolidation for peat thickness varying from 1.5 to six feet was calculated as approximately 12 percent of the initial peat thickness over a 40-year period. The compression of fill can be estimated as 3 percent of the total height of the levee and anticipated settlement in GDM's general settlement equation. It is proposed here to use 5 percent of the levee height to account for settlement due to it own weight and future traffic compaction. Due to the granular nature of the fill, the compression of this material should be a sole function of levee height and compaction effort, and will likely not be affected by the peat thickness. The final component of total settlements results from the additional fill overbuild on top of the design levee height. The required overbuild takes into account the sum of design levee height and anticipated settlements which comprise the levee fill to calculate total long-term secondary compression settlements

A series of design charts were developed for estimating total settlements of the levees as part of the STA-2 study. Using the design charts cited, total settlement of levees for the expected thickness of organic soils were computed as presented below.

ORGANIC SOIL THICKNESS (ft)	PRIMARY SETTLEMENT (ft)	SECONDARY SETTLEMENT (ft)	TOTAL SETTLEMENT (ft)
1.5	0.4	0.2	0.6
3.5	0.9	0.4	1.3
5	1.3	0.6	1.9
6	1.6	0.7	2.3

An alternate approach was pursued for STA-2 design study to back-calculate and crosscheck the approximate amount of compression of peat below existing road levees, and develop a correlation to estimate the settlement of peat for the design cross-sections. Soil borings were conducted from the top of roads and the approximate heights of road levees above the adjacent peats were visually determined. Assuming the peat layer which exists at the ground surface immediately adjacent to the road was initially uniform across the cross-section of road levees, the amount of compression of the peat layer was determined as the difference between the depth to the top peat encountered in the borings, minus the height of the road levee above the adjacent peat surface. Settlements estimated by the correlation were found to be less than those calculated by using laboratory consolidation test data. However, the data are useful for comparative purposes and indicate that the settlement estimates using this approach are slightly conservative.

Calculations performed for levees in the vicinity of STA 1W indicate that 50 percent of the settlement is anticipated within one day and 90 percent of the settlement within four days for peat layers five feet or less in thickness. For STA-2, the time-dependent consolidation of peat was evaluated by using the coefficient of consolidation of 1.0 square foot per day. For the peat thickness of 2, 4, 6, and 8 it, the primary consolidation would be completed within 1, 4, 9, and 16 days, respectively.

The above times to substantially complete primary consolidation are relatively short, on the order of a few days. Therefore, any departures from the estimates may be noticed relatively quickly. Corresponding remedies, if needed, can be implemented while construction equipment is still on-site.

Burns & McDonnell studies dated 1997 for STA 6 recommended that the organic soils exceeding a thickness of 3 feet be removed and a key installed under the central (highest) portion of the levee. The scheme would minimize the settlement of the central part of the embankment. However, other considerations related to the differential settlement and potential levee distress and longitudinal cracking of the compacted section during levee construction soils need be addressed with this option.

5.4.3 Stability Analyses

We performed slope stability analyses for the levee section described above. The analyses were performed using the computer program PCSTABL, developed at Purdue University for the Federal Highway Administration. The program solves general slope stability problems using a two-dimensional limit equilibrium method. The computation for the factor of safety against slope instability is performed using the method of slices. The program uses unique random techniques for generation of failure surfaces within horizontal and vertical limits prescribed by the user. PCSTABL is capable of handling heterogeneous soil systems, anisotropic soil strength properties, excess porewater pressures due to shear, static groundwater and surface water, pseudo-static earthquake loading, surcharge boundary loading, and tie-back loads.

We performed analyses for the end of construction, and steady state seepage for the downstream slope, and rapid drawdown for the upstream slope. A conservative maximum water level at elevation +17 feet, NGVD was used for the steady state rapid drawdown conditions. The stratigraphy of each design cross-section consisted of unreinforced levee fill over peat, underlain by limestone or other clayey/silty soil. The heights of levees were selected based on a +20.5 feet NGVD levee crest elevation. In the analyses, it was assumed, that the fill will be a compacted mixture of peat and in-place limestone/silty, clayey sand soil. The soil parameters used in the analyses are based previous studies, our and our field exploration and laboratory testing as described before. Analyses were performed for subsurface conditions at URS Borings CB-12, CB-16, CB-33, and Nodarse Borings TB-3 and TB-21. The parameters used at each of the boring locations are summarized in Table 3. For each case analyzed, 200 randomly generated failure surfaces were analyzed.

In evaluating the levee stability, two failure surface types, circular and wedge, were evaluated. The circular surface failure is considered the traditional failure mode. The wedge type analysis was performed as the design anticipates leaving the mucks in place beneath the constructed levee section and the wedge type analysis evaluates the base shear stability of the levee cross section for movement along a horizontal plane through the mucks at the base of the compacted levee.

Initially, boundary conditions including crest width, embankment side slopes, bench width, seepage canal bottom elevation, and water elevations in the STA and seepage canal were set at maximum SPF water levels in order to evaluate the impact of each condition on the global stability of the dam. In addition, boundary conditions required to provide adequate factors of safety for seepage were also taken into consideration for the global stability analysis.

The results of the stability analyses are summarized in Table 6. Review of Engineering Manual EM 1110-2-1902 (October 31, 1993) — Slope Stability, Published by the U.S. Army Corps of Engineer (USACE) indicates that the required minimum factors of safety for long term (steady state seepage at maximum storage pool elevation), end-of-construction and rapid drawdown are 1.5, 1.3 and 1.3, respectively. The Table indicates that the computed minimum safety factors exceed or comply with the USACOE-required minimum values. We consider strength gain will be experienced by the consolidating soils over time, and the steady state condition factors of safety will increase based on the soil strength gain.

The results indicate that the most critical failure surfaces in the levees extend only to a limited distance from the toe and do not exhibit a deep base failure in the limestone to jeopardize the stability of canals. This is consistent with previous study results.

We performed analyses for the steady state seepage condition with canal water level at Elevation +8 feet NGVD. The soil parameters used in the analyses are based previous studies, our and our field exploration and laboratory testing as described before. Analyses were performed for subsurface conditions at CB-12, CB-16 and CB-33, and Nodarse's TB-3 and TB-21. For each case analyzed, 200 failure surfaces were evaluated using the Janbu and the Rankine wedge methods. The results of the stability analyses are presented also in Table 6. The results indicate minimum factors of safety (FS) ranging between 1.2 and 1.9. Given the facts that conservative soil strength parameters were used in the analyses and that the critical failure surfaces with the lowest FS value correspond to shallow slips, we conclude that the proposed canal section is safe against slope instability.

For the canal analyses, shallow slope failure surfaces developed in the peat or the underlying materials only, and do not extend to affect the toe of the levee. Therefore, it is concluded that separate stability analysis of cut slope in the canals and fill in the levees is appropriate. The toe of the upstream levee face should be located at a distance exceeding 20 feet from the edge of the canal.

5.4.4 Canal Erosion Potential

This section outlines canal erodability criteria suitable for the preliminary design of the canals of STA 5 Flow-way 3 project. The section identifies material specific limiting hydraulic conditions which if exceeded will require the application of appropriately designed erosion control. measures.

The canal system of STA 5 Flow-way 3 consists of supply distribution and seepage collection canals which will be excavated in the existing peat and rock of the site. The nominal soil profile consists of one to eight feet of peat, an intermittent thin layer of weathered limestone, and a layer of competent limestone that extends below the bottom elevation of the canals. Levees flanking the canal excavations will be constructed of excavated limestone or a mixture of peats and limestone. It is assumed that flow velocities in unprotected canals will not exceed 2.5 fps for the proposed flows and levels without erosion protection measures. The canals will be designed to limit the flow velocity to within this limit. Flow velocities are expected to be high around the control structures. Consequently, erosion control measures will be required in these areas.

Incipient Motion Analysis

An evaluation of the relative canal erosion stability can be made by evaluating incipient motion parameters (FHWA, 1991). The definition of incipient motion is based upon the critical or threshold conditions where hydrodynamic forces acting on one grain of sediment have reached a value that will move the sediment grain. Under critical conditions, or at the point of incipient motion, the hydrodynamic forces acting on the grain are balanced by the resisting forces of the particle.

Incipient motion may be estimated on the basis of maximum allowable velocities or maximum allowable tractive force or shear stress for various types of canal materials (Chow, 1959). The limit of 2.5 fps provides for these shear limits.

For final design, it is appropriate to evaluate scour at various points on the canal cross-sections for soil types and discharge conditions. The appropriate method of evaluation should be based on the incipient analyses as outlined herein.

The previous discussion relates to straight channel sections. Scour at areas of bends, flow diversions, structures, bridges, and pump discharges all amplify the scour potential and therefore require structure specific analysis. Appropriate procedures for the evaluation of scour protection requirements at such flow direction change and/or contraction points are provided in the scour evaluation documentation developed by the Federal Highway Administration (FHA).

<u>Peat Soils</u> - Peat is a fibrous, partially decomposed organic matter or a soil containing large amounts of fibrous organic matter. Peats are dark brown to black, loose, and extremely compressible. When dried, peat will float. A literature research did not reveal any velocity or shear stress limits for peat soils. It will be necessary to rely on the experience gained from the construction and operation of the various STA projects for

final design velocity limits. As a preliminary guide, flow velocities up to and on the order of 2.5 fps are sufficiently low to allow the growth of vegetation (Chow, 1959). Without further guidance, it would be prudent to limit unprotected peat canal sides to sections where the maximum velocities are less that approximately 2 fps.

<u>Limestone</u> - The canal design penetrates into a layer of limestone. Normally limestone is generally considered scour resistant. The USACE suggests a general velocity limit for sedimentary rock of 8 to 10 fps in their design manual referenced previously. This is higher that the nominal 7 fps maximum velocity for which the canal system will be designed. It is recommended that further evaluation based upon the FHA's interim procedure be performed. After encountering several bridge foundation problems in rock, the FHA developed an interim guidance memorandum (FHA memo, 1991) on the scour ability of rock. The guidance utilizes RQD to reflect the relative frequency of discontinuities, the compressibility of the rock mass, and may indirectly be utilized as a measure of scourability. Soft limestones which have an RQD of less than 50 should be assumed to be soil-like with regard to scour potential

If scour in the limestone at high velocity pump or discharge points is a concern, there are two possible approaches. One approach is to provide riprap or concrete protection to prevent the limestone from scouring. The second involves estimating the equilibrium configuration of the scour hole and simply excavating the limestone to a depth and shape approximating it. Guidance for estimating the discharge scour hole shape and size are available in a range of USACE and FHA publications.

5.5 Structure Foundations

The project requires the installation of a number of structures for the inflow and discharge of storm water to the treatment cells. The hydraulic structures for the project include gated culvert inflow and outflow structures, a diversion structure, and a pump station. The structures can be supported by shallow footings or mat foundations placed on in-situ soils/limestone. Structure foundations should not be placed on top of the highly compressible peat soils.

We recommend that the proposed structures be supported on shallow foundations designed for a maximum allowable contact stress of 3,000 pounds per square foot (psf) for dead plus live loads provided the site has been prepared as described above. This value may be increased by 25 percent when considering total loads including temporary wind loads. The bottoms of footings should be embedded at least 18 inches below lowest adjacent grade. To assure an adequate factor-of-safety against a general shearing failure, strip and monolithic slab footings should be at least 18 inches wide, and isolated footings should be no less than 30 inches wide.

Lateral forces may be resisted by passive earth pressure acting on the vertical foundation faces and by friction acting between the bottoms of foundations and the supporting subgrade. We recommend using an equivalent fluid weight of 160 pounds per cubic foot (pcf) to compute passive resistance for moist soil above the water table, and 80 pcf to

compute passive resistance in submerged soil. Passive resistance in the upper 12 inches of soil should be neglected unless it is confined by a slab or pavement. Frictional resistance may be computed using a factor of 0.30 times the sustained dead loads. The above values include a factor of safety of at least 1.5. These values of resistance assume that the foundations are: 1) surrounded by in-situ soil densified by compaction, or clean sand fill which is compacted to 95 percent relative compaction, and 2) able to withstand horizontal movement on the order of ¼ to 3/8 inch.

Foundations designed in accordance with the recommendations above are expected to experience maximum total settlements of two inches or less. Differential settlements that occur between adjacent unequally loaded foundations are not expected to exceed one inch. Due to the granular nature of the subsoils, foundation settlements should occur rapidly and be virtually completed by the end of structural construction. These settlement estimates are based on removing the peat soils from beneath shallow footings.

5.6 Below-Grade Walls

Below-grade walls for the hydraulic structures/pump station should be designed to resist lateral earth pressures from soil and water against the back of the walls. For stability analyses of these walls, the soil bulk unit weight may be taken as 120 pounds per cubic foot (pcf). Wall pressures under static loading conditions should be computed using a triangular pressure distribution and based on equivalent fluid weights of 35 and 55 pcf respectively corresponding to the active and at-rest earth pressure conditions. The active case is for walls that are unrestrained at the top, while the at-rest condition is for restrained walls. Where traffic loading will occur within 10 feet of the back of the wall, the wall should be designed to resist an additional traffic surcharge load of 100 psf acting as a rectangular distribution over the wall height. Other surface surcharge pressures acting parallel to, and within a distance H of, the back of below grade walls (where H is the wall height), should be accounted for by applying a uniform lateral pressure using a coefficient of 0.4 the surcharge intensity over the upper 10 feet of the wall.

5.7 Seismic Stability and Liquefaction Potential

URS evaluated the proposed levees for stability under seismic loading, and concluded that the proposed levees will be stable against rotational instability and excessive deformation under anticipated ground shaking. We reviewed the March 29, 2005 draft Design Criteria Memorandum # DCM-6 titled Liquefaction Evaluation of CERP Dam Foundations prepared by the EvergladesNow/Acceler8. We concur with the reference of this memo to Seed's (1978) conclusion that a well built embankment can withstand a PGA of 0.2g without significant deformation/compromise of stability. Given USGS's (2002) mapping of 0.02 to 0.036g for the area, we consider that under a maximum credible peak ground acceleration of 0.036g, the levees will be stable.

The DCM-6 draft memo analyses used clean sand and PGA of 0.036 and computed no liquefaction <u>regardless of blow count</u> using Youd and Seed (2001). Given the relatively

higher silty and clayey fines content of the STA 5 foundation soils, we conclude that liquefaction potential is negligible for STA 5.

6.0 CONSTRUCTION RECOMMENDATIONS

This section provides general recommendations for the construction of the levees and canal including recommendations for general site preparation, excavation, and dewatering.

6.1 SITE ACCESS AND WORK SURFACE PREPARATION

Access to the site, preparation of work surfaces to receive fill, fill placement, and equipment mobility in proposed canal and borrow excavation areas will present major considerations to the earthworks contractor. Access to and within the site will be restricted due to the remote nature of the site and the difficult surface conditions prevalent in the project area. The presence of the surface peats will pose serious problems to the movement of heavy draglines, bulldozers, compactors, and other construction equipment around the project site. Additionally, the generally high groundwater levels will further complicate site access particularly during the wet season and after significant rainfall events.

Site preparation activities will include preparation of levee and canal alignment areas and the potential construction of limited necessary temporary access roadways to and from work areas. Levee and canal alignment preparation shall include the clearing and grubbing of existing brush and low vegetation. Stands of dense vegetation will require clearing by cutting at the ground surface. The limbs should be removed and disposed of by burning. It is desirable to attempt to leave brush and low vegetation and the root mat from such vegetation in place beneath levees as these materials will act to stabilize the surface peats. In existing sugarcane farm areas, very little site preparation is anticipated. Limited clearing at existing property lines and intermittent infilling of dewatering canals will be required in these areas.

In interior cell areas it will be necessary to locally fill some existing dewatering ditches to mitigate short-circuiting of flow conduits through the cells. Infilling requirements for these ditches will be dictated by cell flow dynamics and are beyond the scope of this study. However, it is anticipated that such canals can be infilled with either adjacent spoil from the canal excavation or loose fill trucked in place and then covered with a thin layer of peat to facilitate wetland type vegetation growth.

6.2 LEVEE AND CANAL CONSTRUCTION

6.2.1 Fill Materials

The levee fill material is to consist of onsite soils obtained from the canal excavations. The material will be a combination of broken limestone, sand and peat blended vertically

(in-place) during the excavating sequence. To further assure that the mixture is well graded, the maximum particle size should be 12 in, although up to 10 percent of over-sized material (between 12 and 24 inches in diameter) could be allowed. Care should be exercised in placing the oversized materials to assure that nesting does not occur and to further assure that the oversize particles are fully surrounded by finer grained materials. Nesting of the oversize materials is not desirable since it can lead to voids incorporated in the fill and to piping failure of the levee.

In canal areas, the organic soils in the cut will need to be excavated separately from the granular materials and stockpiled. The organic excavation may be partial to thin the peat to the prescribed one foot maximum thickness, followed by the vertical blending described above. The gradation requirements for the granular materials are as described above. After the granular materials are placed to form the design section of the levee, the excess organics may by used to dress out the slopes, but at angles no steeper than 4 to 1 (horizontal to vertical).

Shrinkage factors of 50 percent and 66 percent should be used for the blended peat and the segregated/stockpiled peat, respectively. The limestone will bulk when excavated but will be combined with sandy soils which will shrink from in going from the cut to levee. Therefore, a nominal shrinkage factor of 5 percent should be used for the granular material (sand-limestone mix).

6.2.2 Levee Placement Requirements

As a general rule levee embankments are constructed as homogeneous sections because material zoning for such remote and low head levees is usually neither necessary nor practicable. However, where materials of varying permeabilities are encountered in borrow areas, the more impervious materials should be placed toward the waterside of the embankment and the more pervious material toward the landside slope. Where required to improve under seepage conditions, landside berms should be constructed of the most pervious material available and waterside berms of the more impervious materials. Where impervious materials are scarce, and the major portion of the embankment must be built of pervious material, a central impervious core can be specified or, as is more often done, the riverside slope of the embankment can be covered with a thick layer of impervious material. The latter is generally more economical than a central impervious core and is adequate in most cases.

The levee fill should be placed and compacted, as necessary, to achieve a minimum dry density equal to 90 percent of the Modified Proctor value, per ASTM D1557. Single lift construction will not be permitted. Multiple lift construction is acceptable provided the thickness of the initial lift is limited to one-half the levee height above existing grade. Typical initial lift thicknesses should, therefore, be in the range of 2 to 3 feet maximum thickness. The surface of each lift should be made level to allow for density testing prior to placement of the next vertical lift. As a general rule, compaction control testing should be done for every 2,000 cubic yards of fill placed. The inspectors used must be well-trained to observe construction operations, minimizing the number of field density tests

in favor of devoting more time to visual observations, simple measurements, and expedient techniques of classifying soils, evaluating the suitability of their water content, observing behavior of construction equipment on the fill, and indirectly assessing compacted field densities.

Inadequately designed or constructed culverts or other penetrations beneath or within levees can cause serious damage to levees. Each penetration should be evaluated for its potential damage that would negatively impact the integrity of the levee system and could ultimately lead to catastrophic failure. During high water, seepage tends to concentrate along the outer surface resulting in piping of fill or foundation material. High water also results in uplift pressures that may cause buoyancy of some structures. Seepage may also occur because of leakage from the pipe. In addition, loss of fill or foundation material into the culvert can occur if joints are open. The methods of culvert installation should be understood by the designer to anticipate problems that may occur. Some of the principal inadequacies that are to be avoided or corrected are as follows:

- Culverts having inadequate strength to withstand loads of overlying fill or stresses applied by traffic.
- Joints unable to accommodate movements resulting from foundation or fill settlement.
- Unsuitable backfill materials or inadequately compacted backfill.

Major factors to be considered regarding these issues are as follows:

- The height of the levee.
- The duration and frequency of high water stages against the levee.
- The susceptibility to piping and settlement of levee and foundation soils.
- The structural adequacy of existing culvert and joints, and the adequacy of the backfill compaction.
- The ease and frequency of required maintenance.
- Possible consequences of piping or failure of the culvert.
- Previous experience with the owner and the constructors in constructing and maintaining culverts.

6.2.3 Test Section Requirement

Prior to construction, it is recommended that a test levee section be constructed which demonstrates the constructability of the proposed levee design and contractor's proposed construction methodology. The intent of the test section will be to verify the proposed construction procedure. The test section should be instrumented with settlement plates and extensive survey controls provided to evaluate measured settlements and bulking/shrinkage of the borrow materials. The test section should be constructed over a 500 feet length and will be used to establish approval of the procedure for subsequent construction.

6.3 EXCAVATIONS AND DEWATERING

Excavations will be required for seepage collection canals, borrow areas, and for project structures. Excavations into the in-situ limestone will require blasting to fracture the cemented limestone structure to allow for excavation by draglines or backhoe equipment. Excavations through the surface peats and uncemented sands will require that cut slopes be excavated to 1:1 or flatter slopes to prevent sloughing of the materials into the excavation.

Due to the high groundwater level, dewatering may be required for excavations more than a couple of feet below the ground surface. Excavations for borrow canals may be completed in the wet without dewatering or the contractor may attempt to dewater with large surface stationed pumps. Due to the high transmissivity and jointed nature of the insitu limestone, groundwater flows to the excavation will be significant and would likely preclude effective dewatering of significant sections of canal and borrow excavations greater than one-half mile. Fill material excavated in a wet condition, will need to be stockpiled and drained prior to re-use. The fines content of stockpiled soils could be appreciable, thus reducing the permeability and therefore the ability of the soils to drain quickly.

Excavations for structures will extend to depths 10 or more feet below the ground surface. To facilitate their construction, it may be necessary that excavations be potentially sheet piled and dewatered with well points. Groundwater levels in these excavations should be maintained at least one (1) foot below the bottom of the excavations. Groundwater should not be allowed to flow into such excavations should such flow carry soils from beneath foundation areas or result in quick or unstable bottom conditions.

7.0 LIMITATIONS

The contents of this report have been tailored to the requirements of the proposed STA 5 Flow-way 3 expansion project in Hendry County, Florida. The recommendations that have been discussed herein are based on URS's interpretation of site conditions and project needs at the time of writing, our field exploration, and on our engineering analyses and previous experience with similar projects in the area.

The scope of this investigation was limited to evaluating geotechnical design parameters for the project. Environmental conditions such as the presence of petroleum products, hazardous waste, radioactivity, irritants, pollutants, radon or other hazardous substances and conditions were not the subject of this study. The presence (or absence) of such contaminants or conditions is neither implied nor suggested by this memorandum. Additionally, evaluation of karst-related sinkhole potential was not included in the scope of this study.

URS warrants that its services are performed, within the limits prescribed by its Clients, with the usual thoroughness and competence of the consulting profession, in accordance

with the standard for professional services at the time those services are rendered. No other warranty or representation, either expressed or implied, is included or intended in its proposals, contracts, or reports.

The implementation of our recommendations for the project will require appropriate testing, construction surveillance and construction-phase monitoring under professional direction of URS.

This report should not be used without prior approval by URS if the nature, size, configuration, location, orientation of the project structures, or project ownership is changed. Furthermore, this report should not be used for any other sites.

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URS Corporation has appreciated the opportunity to be of service to you for the proposed STA 5 Flow-way 3 expansion project. Please feel free to contact the undersigned with any questions or comments regarding this report.

Respectfully Submitted, URS Corporation

Garfield 1 Wray, P.E. Lead Senior Geotechnical Engineer

Fernando Parra, Ph.D., P.E. Senior Engineer

TABLE 1
SUMMARY OF INSITU PERMEABILITY TESTS
SFWMD STA 5 EXPANSION
HENDRY COUNTY, FLORIDA

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Test Location	C1-1	C1-2	C1-3	C2-1	C2-2	C2-3
Depth Interval (ft)	35 - 45	20 - 30	5 - 15	5 - 15	35 - 45	20 - 30
Stratum Tested	Sand, silty,	l impetone	Limestone, clay	Limestone,	Silty clayey sand,	Silty clayey sand,
	clayey		and sand	sand	limestone fragments	limestone fragments
Permeability (ft/day)	0.15	0.09	6.0	0.5	0.2	0.2

TABLE 2A SUMMARY OF LABORATORY PHYSICAL TESTING SFWMD STA 5 EXPANSION HENDRY COUNTY, FLORIDA

Boring ID CB	Sample	Depth (ft)	Soil Description	- #200 Sieve	Natural Moisture	Atterberg	Limits (%)	Organic Content
	From	То		(%)	(%)	LL	PI	(%)
1	0.0	2.0	Silty sand	18.8	24			(/
1	4.0	6.0	Sand w/ Clay	7.6	15	† 		· · · · · · · · · · · · · · · · · · ·
1	6.0	8.0	Sand w/ Clay	8.9	14	· · · · · · · · · · · · · · · · · · ·	1	
1	8.0	10.0	Sand w/ Clay	8.9	18	 	1	
1	13.5	15.0	Clayey sand	18.7	23		1	
1	18.5	20.0	Clayey sand	24.3	12			
1	28.5	30.0	Clayey sand w/ Limestone	19.0	28	<u> </u>		
2	0.0	2.0	Sand	1.3	5			
2	2.0	4.0	Sand	1.0	6			
2	6.0	8.0	Sand	0.9	15			
2	13.5	15.0	Clayey sand	15.3	33	<u> </u>	l	
2	18.5	20.0	Clayey sand	26.9	33			
3	6.0	8.0	Sand	2.1	20			
3	8.0	10.0	Sand	1.6	20			
3	18.5	20.0	Sand, with clay/rock fragments	9.2	27			
4	4.0	6.0	Sand	4.8	15			
4	8.0	10.0	Sand, with clay/rock fragments	6.5	15			
4	13.5	15.0	Sand with clay	10.8	19	23	5	
4	18.5	20.0	Clayey sand	16.7	23		 	
4	23.5	25.0	Clayey sand	14.2	22			
5	8.0	10.0	Sand with silt	9.0	17			
5	13.5	15.0	Sand, silty wth rock fragments	5.2	26			· · · · · · · · · · · · · · · · · · ·
5	18.5	20.0	Sand, clayey wth rock fragments	21.1	19			
6	2.0	4.0	Sand	3.1	13			·
6	8.0	10.0	Clayey sand	13.7	16	•		
6	13.5	15.0	Clayey sand	13.4	26		-	
6	18.5	20.0	Clayey sand	13.5	33	1	-	
7	13.5	15.0	Clayey sand	18.0	40			
7	18.5	20.0	Clayey sand	11.3	29			
7	23.5	25.0	Limestone and clayey sand	13.8	27			
8	6.0	8.0	Sand and clay	18.8	22	19	3	
8	8.0	10.0	Limestone and clayey sand	32.3	21	19		
8	13.5	15.0	Silt	32.3	28	28	-	
8	18.5	20.0	Silt		30	31	6	
8	23.5	25.0	Silt		36	36		
9	4.0	6.0	Sand	2.9	20	30	10	
9	13.5	15.0	Sand with clay	10.4	30			
9	18.5	20.0	Sand with clay	8.6	30			
9	23.5	25.0	Clayey sand	26.3	25			
10	2.0	4.0	Sand	1.1				
10	8.0	10.0	Sand, clayey wth rock fragments		13			
11	6.0	8.0		23.5	16			
			Limestone and clayey sand	19.7	17			
11	13.5	15.0	Limestone and clayey sand	15.1	19			
11	23.5	25.0	Clayey sand	22.7	27			
12	6.0	8.0	Limestone and clayey sand	12.4	14			
12	18.5	20.0	Clayey sand	19.2	27			
13	4.0	6.0	Clayey sand	14.0	16			
13	13.5	15.0	Sand, slightly clayey	2.6	22			
13	23.5	25.0	Clayey sand	18.7	25			
14	6.0	8.0	Limestone and clayey sand	24.3	18			
14	13.5	15.0	Limestone and clayey sand	16.6	13],	
14	18.5	20.0	Clay		32	47	22	
14	23.5	25.0	Limestone		39	43	15	
15	2.0	4.0	Sand, slightly clayey	21.0	24			
15	6.0	8.0	Sandy Limestone		15	19	2	

TABLE 2A (CONT' D) SUMMARY OF LABORATORY PHYSICAL TESTING SFWMD STA 5 EXPANSION HENDRY COUNTY, FLORIDA

Boring ID CB	Sample I	Depth (ft)	HENDRY COUNTY, FL Soil Description	- #200 Sieve	Natural Moisture	Atterberg	Limits (%)	Organic Content
СВ	From	То	· · · · · · · · · · · · · · · · · · ·	(%)	(%)	LL	PI	(%)
15	18.5	20.0	Clay		67	121	82	· · · · · · · · · · · · · · · · · · ·
15	28.5	30.0	Clayey Sand	17.1	21			
16	2.0	4.0	Sand	0.7	19	f		· · · · · · · · · · · · · · · · · · ·
16	4.0	6.0	Clayey Sand	13.4	16			
16	6.0	8.0	Clayey Sand	14.0	16			
16	13.5	15.0	Silty Clayey Sand	27.3	19			<u> </u>
17	2.0	4.0	Sandy Silt	1	18	24	9	
17	4.0	6.0	Clay	·	12	20	9	
17	18.5	20.0	Clay		27	34	13	
18	2.0	4.0	Sandy clay	54.7	18		"	,
18	13.5	15.0	Clayey Sand	28.7	27			
19	2.0	4.0	Clayey Sand	18.1	23			
20	2.0	4.0	Sand with silt	11.7	48		<u> </u>	
20	6.0	8.0	Silty sand	34.9	18		 	
20	13.5	15.0	Sandy Clay	1	24	29	9	
21	2.0	2.2	Limestone with Sand	2.4	24			
21	4.0	6.0	Sand with silt	11.5	19			
21	13.5	15.0	Clay	11.5	32	27	10	·
22	2.0	4.0	Sand	4.4	21		10	
22	13.5	15.0	Clayey Limestone	4.4	23	23	7	
23	4.0	6.0	Clayey Sand	21.8	24	. 23		
23	6.0	8.0	Clayey Sand					
23	8.0	10.0		26.1	17	0.4		·
23	13.5	15.0	Clayey Sand Clay	 	24	24	6	
24	6.0	8.0		04.0	36	25	4	· · · · ·
24	8.0	10.0	Clayey Sand	24.3	15			<u> </u>
25	2.0		Clay with Sand	53.8	18			
25	4.0	4.0	Limestone and Clayey Sand	12.7	14	- 00		
26	0.0	6.0	Limestone and Clayey Sand	00 7	15	26	6	
26		2.0	Silt	30.7	9	25	5	
28	4.0	6.0	Clayey Sand	18.8	14			
29	18.5	20.0	Clayey Sand	13.9	22			
30	8.0	10.0	Limestone	05.5	16	19	3	
30	6.0	8.0	Clayey Sand	25.5	16		·	
	13.5	15.0	Clayey Sand	24.0	15		<u> </u>	
31	4.0	6.0	Limestone and Peat	00 =				7
32	6.0	8.0	Clayey Sand	29.7	27			
32	13.5	15.0	Clay	52.2	17	25	7	
33	8.0	10.0	Clayey Sand	28.4	12			
33	13.5	15.0	Clayey Sand	29.9	17			
34	2.0	4.0	Peat	<u> </u>	227			53
34	4.0	6.0	Peat		202			34
34	6.0	8.0	Limestone and Silty Sand		21	23	5	
35	6.0	8.0	Peat		459			79
35	8.0	10.0	Peat and Silty Clay		68			9
35	13.5	15.0	Limestone and Clay		22	26	10	
35	23.5	25.0	Clay		21	27	7	
36	4.0	6.0	Peat		32			6
36	18.5	20.0	Limestone and Clayey Sand		25	29	3	
36	23.5	25.0	Limestone and Clayey Sand	12.5	18			

TABLE 2B SUMMARY OF LABORATORY CHEMICAL TESTING SFWMD STA 5 HENDRY COUNTY, FLORIDA

BOREHOLE			CH :		ъ.
BOKEHOLE	DEPTH	pН	Chlorides	Sulfates	Resistivity
СВ-	(ft)		(ppm)	(ppm)	(Ohms-cm)
1	4-6	8.2	90	87.9	
1	8-10	8.1	90	94.5	
2	0-2	7.1	105	67.5	
2	4-6	6.9	75	60	
2	13.5-15.0	7.7	90	75.3	
3	2-4	7.2	105	63.6	
4	2-4	4.7	105	105.6	
4	13.5-15.0	7.7	105	90	
5	0-2				1500
.6	13.5-15.0	6.6	-90	102	
8	4-6	8.4	90	98.4	
8	8-10	8.4	90	71.1	
10	6-8				1700
13	6-8			÷	1300
35	6-8	7.1	120	95.1	
35	13.5-15.0	7.9	90	87.9	
. 36	0-2	7.8	105	107.7	
36	2-4	8	90	62.6	
43	18.5-20.0	8.4	90	117.9	

TABL_ 2C SUMMARY OF LABORATORY COMPACTION TESTING SFWMD STA 5 HENDRY COUNTY, FLORIDA

			MAX. DRY UNIT	OPTIMUM WATER
	LOCATION	MATERIAL	WEIGHT	CONTENT
			(pcf)	(%)
STA5-3B.	Southern border, approximately 300 feet from eastern most side of cell	Brown fine sand with limestone fragments and organic matter	81.3	23.5
STA5-3B.	Southern border, approximately 450 feet from eastern side of cell	Brown fine sand with scarce limestone fragments	114.3	8.5
STA5-3B.	Southern border, approximately 4250 feet from eastern side of cell	Brown fine sand with limestone fragments	94.5	22
STA5-Section 2.	STA5-Section 2. Northern border, approximately 450 feet from eastern side of cell	Brown fine sand with scarce limestone fragments, and organics	103.5	17.5
STA5-Section 2.	STA5-Section 2. Southern border, approximately 2050 feet from eastern side of cell	Brown fine sand with scarce limestone fragments, and organics	106.8	16

SUMMARY OF STRENGTH PARAMETERS

STA-5 EXPANSION HENDRY COUNTY, FLORIDA

BORING	SOIL TYPE	AVERAGE SPT "N-VALUE"	GROUND ELEV.	GROUND SURFACE ELEVATION (ft)	GROUND WATER ELEVATION (ft)	UNIT W (Lb)	UNIT WEIGHT (Lb/ft3)	END OF CONSTRUCTION / RAPID DRAWDOWN CONDITION	CONDITION
		,	From	To		Moist	Saturated	Su (psf)	•
			-		STA 5	,			
	FILL	(1) 8	20.5	12.0		115	122	350	0
CB-12	SAND W/ SOME SILT	8	12.0	8.0	C	105	110	0	30
!	LIMESTONE AND SAND	10	8.0	-6.0	0.00	133	135	0	35
	CLAYEY SAND	8	-6.0	-18.0		105	110	500	0
	FILL	8 (1)	20.5	12.0		115	122	350	0
	MUCK	1 ⁽²⁾	12.0	10.0		65	89	200	0
CB-16	CLAYEY SAND	6	10.0	0:9-	8.0	105	110	009	0
	CLAY	5	-6.0	-11.0		110	120	500	0
	CLAYEY SAND	23	-11.0	-18.0		110	115	1500	0
	FILL	8 (1)	20.5	10.0		115	122	350	0
	SAND W/ SOME SILT	6	10.0	5.0		100	105	0	28
CB-33	CLAYEY SAND	99	5.0	1.0	C	115	120	2500	0
}	CLAYEY SAND	. 11	1.0	-4.0	000	105	110	800	0
	CLAYEY SAND	28	-4.0	-14.0		110	115	1500	0
	CLAYEY SAND	11	-14.0	-19.0		105	110	800	0
	FILL	8 (1)	20.5	10.0		115	122	350	0
TB-3	MUCK	9	10.0	8.0	œ	65	89	200	0
	SAND W/ SOME SILT	26	8.0	4.0	?	110	115	0	32
	SAND W/ SOME SILT, SHELL	9	4.0	-18.0		100	105	0	29
	FILL	8 (1)	20.5	12.0		115	122	350	0
	MUCK	4	12.0	6.0		65	89	200	0
TB-21	SAND W/ SOME SILT	10	6.0	0.0	8.0	115	120	0	30
	CLAY	10	0.0	-5.0		105	110	800	0
	SAND W/ SOME SILT, SHELL	36	-5.0	-18.0		105	110	0	34
(1) Permeability val	(1) Permeability values taken from Stormwater Treatment Area	A Area & Especial	ac Conetrior	on Droject Seer	Tour O window o	March 5 4007 142		A	

(1) Permeability values taken from Stormwater Treatment Area 6 - Evergiades Construction Project - Seepage Analysis Report, March 5, 1997, Montgomery Watson Americas, Inc. (2) Horizontal permeability taken as the mid-range value from the permeability range for muck materials published in the U.S. Department of Agriculture - Soil Survey for Hendry County, Florida (3) Assumes hydraulic conductivity for compacted muck material underneath the levee equal to Kh = 0.1 ft/day and Kv = 0.05 ft/day

TABLE 3 (LONT'D) SUMMARY OF SOIL CONDUCTIVITY PARAMETERS SFWMD STA 5 EXPANSION

HENDRY COUNTY, FLORIDA

BORING						
	SOIL TYPE	GROUND SURF	GROUND SURFACE ELEVATION (ft)	UNIT WEIG (Lb/ft3)	UNIT WEIGHT (Lb/ft3)	GROUND WATER ELEVATION (ft)
		From	To	Moist	Saturated	
			STA 5			
	FILL	20.5	12.0	115	122	
CB-12 SAND I	SAND W/ SILT TO SILTY SAND	12.0	8.0	105	110	,
1	LIMESTONE AND SAND	8.0	-6.0	133	135	0.80
	CLAYEY SAND	-6.0	-18.0	105	110	·
	FILL	20.5	12.0	115	122	
	MUCK	12.0	8.0	65	68	
CB-28	LIMESTONE AND SAND	8.0	2.0	138	140	11.0
	SAND	2.0	-12.0	105	110	
	CLAYEY SAND	-12.0	-18.0	105	110	•
	FILL	20.5	10.0	115	122	
CB-33 SAND	SAND W/ SILT TO SILTY SAND	10.0	5.0	100	105	8.0
	CLAYEY SAND	5.0	-19.0	115	120	

(1) Permeability values taken from Stormwater Treatment Area 6 - Everglades Construction Project - Seepage Analysis Report, March 5, 1997, Montgomery Watson Americas, Inc. (2) Horizontal permeability taken as the mid-range value from the permeability range for muck materials published in the U.S. Department of Agriculture - Soil Survey for Hendry County, Florida (3) Assumes hydraulic conductivity for compacted muck material underneath the levee equal to Kh = 0.1 ft/day and Kv = 0.05 ft/day

TABLE 4
COMPARISON OF SOIL PARAMETERS
STABILITY ANALYSES
SFWMD STA 2, STA 6
HENDRY COUNTY, FLORIDA

Fill				
Moist Saturated		Strength P	Strength Parameters	
	c (pst)	φ (deg)	c (pst)	Φ (deg)
	-	End of Construction/Rapid	Stead	Steady State
	STA 2			
115 122 65 68 138 140 115 68 65 68 65 68 138 140 105 110 115 122 65 68 65 68 122 65 68 138 140 105 110	- 350	0	100	33
115 122 65 68 138 140 115 68 65 68 65 68 138 140 105 110 115 65 68 65 68 110 110 110 110 110 110 110 11	- 250	0	150	20
115 122 65 68 138 140 105 110 115 68 65 68 138 140 105 110 115 68 65 68 110 110 110 110 110 110 110 11	0	45	0	45
115 122 65 68 138 140 105 110 115 68 65 68 138 140 105 110 122 68 65 68 115 122 65 68 128 & 133 130 & 135 105 & 110 110 & 110 & 120	STA 5			
65 68 138 140 105 110 115 122 65 68 138 140 105 110 65 68 115 122 65 68 128 413 128 813 105 110 110 110 110 110	122 350	0	100	33
138 140 105 110 115 122 65 68 138 140 105 110 65 68 65 68 122 68 65 68 128 & 133 130 & 135 105 & 110 110 & 120		0	100	15
105 110 115 122 65 68 138 140 105 110 115 68 65 68 128 8 133 130 & 135 105 & 110 & 120	140 0	45	0	45
115 122 65 68 138 140 105 110 115 122 65 68 128 & 133 130 & 135 105 & 110 & 120	110 0	30	0	30
115 122 65 68 138 140 105 110 115 122 65 68 128 & 133 130 & 135 105 & 110 & 120	STA 6 - (1995			
65 68 138 140 105 110 115 122 65 68 128 & 133 130 & 135 105 & 110 110 & 120	122 350	0	100	33
138 140 105 110 115 122 65 68 128 & 133 130 & 135 105 & 110 & 120	68 200	0	100	15
115 112 65 68 128 & 133 130 & 135 105 & 110 & 120	140 0	45	0	45
115 122 65 68 128 & 133 130 & 135 105 & 110 & 120	110 0	30	0	30
115 65 128 & 133 105 & 110	STA 5 - (2005			
65 128 & 133 105 & 110	122 350	0	100	32
128 & 133 105 & 110	68 200	0	100	15
105 & 110	8 135 0	32, 35	0	32, 35
	0 8 120 0	28,29, 32 & 34	0	28,29, 32 & 34
Clayey Sand 105 & 110 & 115	8 115 500, 600, 800, 1500	0	100	20, 28, 30,

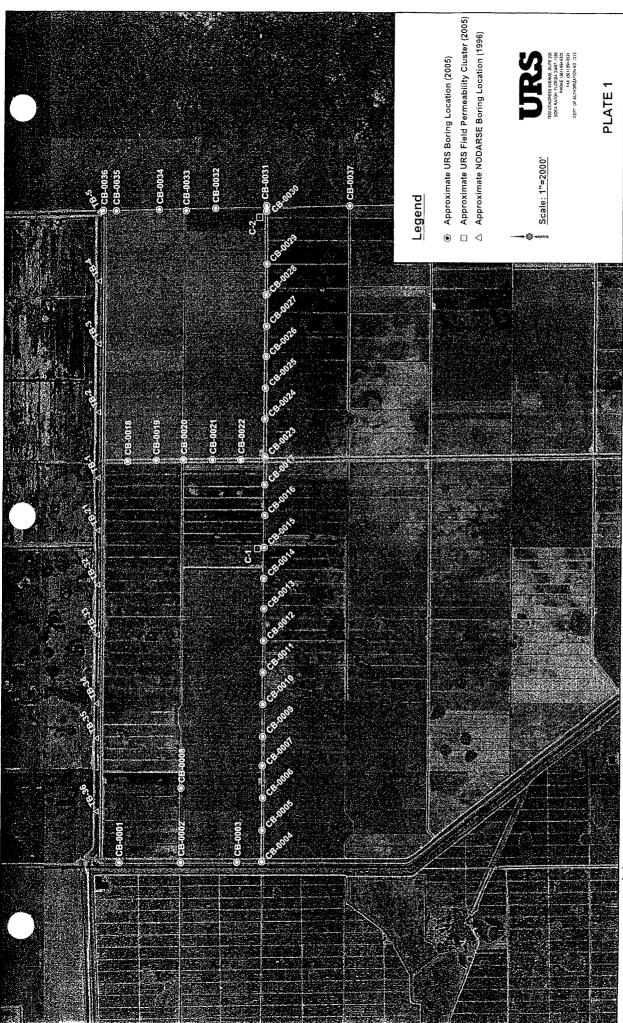
TABLE 5 COMPUTED SEEPAGE QUANTITIES STA-5 FLOW-WAY 3 EXPANSION HENDRY COUNTY, FLORIDA

	Seepage Flow (ft³/day-linear foot)			
Location	with key ditch	without key ditch		
CB-12	-	1.5		
CB-28	7.5	10.6		
CB-33	 	2.1		

TABLE 6 SUMMARY OF EMBANKMENT SATCBILITY ANALYSES **SFWMD STA 5 EXPANSION** HENDRY COUNTY, FLORDA

CONDITION	MIN	IMUM SA	FETY FA	CTOR, F	REQUIRED MINIMUM SAFETY FACTOR	REMARKS	
	CB-12	CB-16	CB-33	TB-3	TB-21	-	
END OF CONSTRUCTION	1.6	2.0	2.1	1.8 ⁽²⁾	1.7	1.2	ок
STEADY STATE	1.8	1.7	1.6	1.5	1.7	1.5	ок
RAPID DRAWDOWN	1.7	1.9	1.6	1.6	1.4	1.2	ок

Note: Analysis performed using Janbu Modified Method
(2) Rankine Block Method



South Florida Water Management District Contract CN040936-W005, STA-5 Flow-way 3 Basis of Design Report

APPENDIX A

BORING LOGS

URS

							Н	ole No	. CP05	-STA5N-	CB-000
DRILLI	NG LOG	DIV	SION	INSTALLATIO	NC					SHEET OF 1	1 Shee
1. PROJECT				10. SIZE A	ND TYPE	OF BIT	Se	e rema	ırks	101 1	SILL
SFWMD ST. 2. LOCATION CO.	A 5/6 EXF	PANSION	DESIGN	11. COORD	INATE SYS	STEM\DAT			STURBED	UNDISTU	
		.01(E),Y=	=762458.94(N)	12. MANUF	ACTURER'	S DESIGN/	ATION OF	DRILL	NAD83	: NG	/D29
J. DRILLING AGE	NCY			Mobile	B53						
WILLIAMS I		ENCES		13. TOTAL	SAMPLES			DISTURBE	9	: UNDISTURBE	D)
CP05-STA	5N-CB-00	001		14. TOTAL	NUMBER	CORF BOY	CFS	·	0	- (
5. NAME OF DRI	LLER	•		15. ELEVAT					Ft.		
6. DIRECTION OF	HOLE			16. DATE E	BODING		STARTE		: 0	COMPLETED	· ·
VERTICAL	II	NCLINED	DEG. FROM VERT.	·				1/16/2		11/16/	2004
7. THICKNESS OF	F OVERBURDEN	1	N/A Ft.	17. ELEVAT				,	+15.9	11.	N/A %
8. DEPTH DRILLE	D INTO ROCK		5.0 Ft.	19. SIGNAT			•				N/A A
9. TOTAL DEPTH	OF HOLE		30.0 Ft.			,	J. Lang	gley, Ge	ologist		
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)		% REC	BOX OR SAMPLE	RQD OR UD		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
+15.9	0.0		SILTY SAND, fine, brown to gray to tan	, trace	33	1	-		SPT Sampler		
	====		shell, trace limestone fragments (SM (-200=18.8%, w=24%))				+14.4		<u> 8 </u>	14
			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \							-	
+12.4	3.5										
112.7		//	SAND, brown, trace shell (SP-SC)		44	2			SPT Sampler	- 6	
			(-200=7.6%, w=15%)					+10.9		<u>- 6</u> 5	11
:							1				
			_		222	3		9	SPT Sampler	8	
			Tan, clayey (SP-SC) (-200=8.9%, w=14%)				_	+8.4		7	14
		///								1 .	
		///	Brown (-200=8.9%,w=18%) (SP-SC)		50	4		9	SPT Sampler		
								+5.9		5	10
		///									
				•							
			White to light gray, clayey, with shell		67	5			SPT Sampler		
			fragments		"				or i Sumplei	6	11
			(-200=18.7%, w=23%) (SC)					+0.9		5	
	_=										
			(-200=24.3%, w=12%) (SC)		100	6]]	·s	SPT Sampler	4	
	= 1							-4.1	•	4 7	7
		///		Ī							·
	=			j							
-7.6	23.5			1							
			LIMESTONE, gray, sandy, shell fragment	; (LS)	89	7		S	SPT Sampler		
								-9.1		11	24
	_=										
				İ	,	,					
					,						
-12.6	28.5	<u> </u>									
			SAND, gray, clayey, with limestone frag (-200=19%, w=28%)	ments (SC)	67	9		S	PT Sampler	-4-3	-
-14.1	30.0		BORING TERMINATED AT 30 FEET ON 11/16/2004					-14.1		2	5
	≡		DOMING TERMINATED AT 30 FEET UN 11/10/2004								

		DIVI	SION	INSTALLATIO	N .		H-	ole N	o. CPU5-	STA5N-C	. <u>B-000</u> 2
DRILLIN	IG LOG									of 1	SHEET
. PROJECT	F/c FVI	ANCION	DECICAL	10. SIZE A				ee ren			
SFWMD STA		PANSION	DESIGN	11. COORD	NATE SYS	TEM\DATI	JM	:	DISTURBED NAD83	UNDISTUR	BED /D29
	=673833	.60(E), \	r=760446.90(N)	12. MANUF		DESIGNA	TION OF	DRILL	NADOS		1023
WILLIAMS E	ARTH SCII	ENCES		13. TOTAL				DISTUR		UNDISTURBE	
CP05-STA5		02		14. TOTAL	NUMBER 1	ORF BOX	FS	<u> </u>	9 0	: .	
. NAME OF DRILL	LER			15. ELEVAT				1	1,6Ft.		
JOHN DIRECTION OF	HOLE			16. DATE E	ORING		START	ED	- CO	MPLETED	
⊠ VERTICAL		NCLINED	DEG. FROM VERT.			OF BODIN		1/17/	/2004 :		2004
. THICKNESS OF	OVERBURDEN	1	N/A Ft.	17. ELEVAT				<u> </u>	+17.6 F	Τ.	N/A %
. DEPTH DRILLED	INTO ROCK		N/A Ft.	19. SIGNAT					.		N/A A
. TOTAL DEPTH (OF HOLE		30.0 Ft.						Geologist		
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)		% REC	BOX OR SAMPLE	RQD OR UD		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
+17.6	0.0		SAND, fine, dark brown, silty (-200=1.3%, w=5%) (SP)		42	1			SPT Sampler	57	4.4
	1		(, ", (/					+15.6		7 7	14
	7		Brown yellow interbedded with tan yello	w	100	2			SPT Sampler	<u>5</u>	
	1		(-200=1%, w=6%) (SP) Gray to dark gray to brown gray					+13.6		6	12
					75	3			SPT Sampler	7	
7	7		Tan, fine, to dark brown black					+11.6		8	14
+	- =		(-200=0.9%, w=15%) (SP)		75	4		111.0	SPT Sampler	<u>8</u> 12	
	===		Brown to tan		İ					10	18
	=				100	5		+9.6	SPT Sampler	<u>8</u> 8	
	→		Medium, white to gray							9	20
			Green, clayey					+7.6		10	
			,,								
	₽										
		//	(()								
			(-200=15.3%, w=33%) (SC) Gray to light gray		89	6			SPT Sampler	3	
			ordy to light gray					+2.6		3	5
					1						
		///									
		///			89	7			SPT Sampler	2	
			Dark gray, clayey, trace shell (-200=26.9%, w=33%) (SC)					-2.4		1	5
		///	(=== =================================								
			·		100	8			SPT Sampler		
	→				100	0		-7.4	ar i aumpier	4	9
		///		ŀ				-/. 4		5	
,											
		///									
		///		Ī							
					100	9			SPT Sampler	-4	
-12.4	30.0		DODING TEDMINATED AT 70 FFFT ON				· - · · · · ·	-12.4		7	11
			BORING TERMINATED AT 30 FEET ON 11/17/2004								

<u></u>	1						H	ole No.	CP05-	STA5N-C	B-0003
DRILLI	NG LOG	DIVI	ISION	INSTALLATIO	ON					SHEET	1
1. PROJECT		1		10. SIZE A	ND TYPE	OF BIT	<u> </u>	ee rema	rke	OF 1	SHEET
SFWMD ST		PANSION	DESIGN	11. COORD					TURBED	: UNDISTUR	BED
2. LOCATION COO		47/m\ v.	-7E9C24 EC(N)					<u> </u>	NAD83	: NG\	/D29
3. DRILLING AGEI		1.43(E),13	=758624.56(N)	12. MANUF Mobile		S DESIGNA	ATION OF	DRILL			
WILLIAMS E	EARTH SCI	ENCES		13. TOTAL				: DISTURBE)	: UNDISTURBE	D
4. BORING DESIG		007						:	9	<u>:</u> c)
CP05-STA		003		14. TOTAL	NUMBER	CORE BOX	ES		0		
JOHN	LLK			15. ELEVAT	ION GROU	JND WATE		10.			
6. DIRECTION OF				16. DATE E	BORING		START	ED 1/17/20		MPLETED 11/17/2	2004
VERTICAL .		INCLINED	DEG. FROM VERT.	17. ELEVAT	ION TOP	OF BORIN		1/1/2	+17.6 F		2004
7. THICKNESS OF	OVERBURDE	N	N/A Ft.	18. TOTAL					7 1710 1		N/A %
8. DEPTH DRILLE			N/A Ft.	19. SIGNAT							1771
9. TOTAL DEPTH	OF HOLE		30.0 Ft.	l			J. Lan	gley, Ge	ologist	·····	
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)		*	BOX OR SAMPLE	RQD		REMARKS	.₹. -	N- VALUE
		밀	(Description)		REC	SAM	OR UD		KEWAKKA	BLOWS/ 0.5 FT-	X AL
+17.6	0.0		SAND, fine, light brown to dark brown,	silty (SP)	83	- 1		9	PT Sampler	5	
			Brown to tan to gray							5	12
			Dark brown to light gray to white		63	2		+15.6	PT Sampler	6	
									·	4	8
	-3:		C 4- 15-14		75	3		+13.6	DT C	7	
,	, 크		Gray to light gray		/3	3		3	PT Sampler	<u>14</u> 12	23
4	<u> </u>							+11.6		11	23
	₹		Light brown to gray to dark brown (-200=2.1%, w=20%) (SP)		83	4		,	PT Sampler	6 5	
	3		(-200-2.1%, #-20%) (31)					+9.6		6	11
	7		Brown to dark brown		100	5		T9.0	PT Sampler		
	===		(-200=1.6%, w=20%) (SP)							- 6	12
	<u>-</u> ₫:							+7.6		6	
	_=			j							
			Dark brown								
			Tan to light brown,clayey, trace shell		67	6		:	PT Sampler		
	1		run io light brown, clayey, trace shell		"	U			i r Sumplei	<u>5</u>	15
	3			Ì				+2.6			
	─				}						
	<u> </u>				1					ŀ	
					100	7		S	PT Sampler	3	
			Olive green to tan, with rock fragments pebbles (-200=9.2%, w=27%) (SP-SC)	,				-2.4		2	4
	<u></u>	//	possios (200-3.2%, #-27%) (31 30)								
				İ							
		///									
	<u> </u>	. V - U - U - V - V - V - V - V - V - V -									
			Olive to light beauty	İ	100	8		s	PT Sampler	11	
			Olive to light brown Olive, without pebbles (SP)	ļ				-7.4		-1	3
	= =										
	事			l			ļ				
				l			İ				
	<u>-</u> 3		Olive gray, calcareous, abundant shell		100	9		S	PT Sampler	3	
-12.4	30.0	जन्म ः	fragments, pebbles	——∤			}	-12.4		3	7
			BORING TERMINATED AT 30 FEET ON 11/17/2004	ļ							ı
NG FORM 183	36 GV 296V 1	20615215 5	FWMD\BORING LOGS\revisions 2_3_05\b-3.dw	3/23/200	25 0.30.	14 AM ES	<u> </u>		·		

				,			Н	ole No.	CP05-	STA5N-C	B-000
DRILLI	NG LOG	DIVI	SION	INSTALLATIO	ЭN					SHEET OF 1	1 Sheet:
1. PROJECT				10. SIZE A	ND TYPE	OF BIT	5	ee remar	les .	OF 1	2HFF1
	A 5/6 EXPA	NSION	DESIGN	11. COORD					URBED	: UNDISTUR	RBED
2. LOCATION CO		/(E) V-	=757820.47(N)		···			<u> </u>	NAD83	: NG\	/D29
3. DRILLING AGE		4(E),1-	-/3/820.4/(N)	12. MANUF. Mobile		5 DESIGNA	TION OF	DRILL			
WILLIAMS I	EARTH SCIEN	NCES		13. TOTAL				: DISTURBED		: UNDISTURBE	D
4. BORING DESIG		4						:	9	: <u> </u>)
5. NAME OF DRI	.5N-CB-000	4		14. TOTAL	NUMBER	CORE BOX	ES		0		
JOHN	CLER			15. ELEVAT	ION GROU	ND WATE		12.7			
6. DIRECTION OF	HOLE			16. DATE E	BORING		START	ED 1/17/20		MPLETED 11/17/2	2004
▼ VERTICAL		CLINED	DEG. FROM VERT.	17. ELEVAT	ION TOP	OF BORIN		1/1//20	+18.7 F		2004
7. THICKNESS O	F OVERBURDEN		N/A Ft.	18. TOTAL				G	110.7		N/A ?
8. DEPTH DRILLE	D INTO ROCK		N/A Ft.	19. SIGNAT							
9. TOTAL DEPTH	OF HOLE		30.0 Ft.				J. Lan	gley, Geo	logist		
ELEVATION	DEPTH	2	CLASSIFICATION OF MATERIALS		%	문	RQD		REMARKS	75. T	, 岁
		LEGEND	(Description)		REC	BOX OR SAMPLE	OR UD		KEMAKKS	BLOWS/ 0.5 FT-	N- VALUE
+18.7	0.0		SAND, gray to dark brown sand, silty,	rock	100	1		SF	T Sampler_	9	
			fragments (road fill) (SP)								15
			Dark brown		67	2		+16.7	T Sampler	<u>8</u>	
	Z -		Dark Brown	-	"	-		31	1 Sumple	6	11
	<u> </u>		Fine, gray to dark brown (-200=4.8%,	w=15%)				+14.7		5	
			Gray to white Dark brown	(SC)	75	3		SF	T Sampler	- 6	
7	7							+12.7		5	11
7			Light brown to gray		83	4			T Sampler	7	
										- 8 -	13
			Down down about]	100			+10.7	T. C	6	
			Brown, trace shell fragments Dark brown to brown, with limestone		100	5		21	T Sampler	8 8	15
			fragments (-200=6.5%, w=15%) (SP-S+	A)		:		+8.7		- 7	13
			Brown					1011			
			Dark brown								
			Gray to olive green		i						
			(-200=10.8%, w=19%, LL=23%, PI=5%)	(CD CU)							
+4.7	14.0		Medium to fine, tan, trace shell	(3F-3M)	89	6		SP	T Sampler		
	∃/		CLAYEY SAND, gray to light green				,	+3.7		9	16
				Ī		l				l	
				}							
	=/		White to light army turns shall (200-4	5 70/	ļ						
-			White to light gray, trace shell (-200=1 w=23%) (SC)	0./%,	100	7		SP	T Sampler		
	∄/		, , ,	}				-1.3		$\frac{\overline{2}}{2}$	4
ĺ	国/			1							
	= /									l	
	= /										
	_{										
			Gray, sand (-200=14.5%, w=22%) (SC)	†	100	8		SP	T Sampler	5	
	3/]				-6.3	,	66	14
				Ì	1					*	
	- 			ļ							
	-1/										
	。_									-	
-9.8	28.5		SILT, olive to tan, clayey, with abundant	shell	100	9		SP	T Sampler	2	
11.3	30.0		fragments, pebbles, medium stiff (ML)	511511	, 30	٠			. complet .	3	7
	30.0		BORING TERMINATED AT 30 FEET ON					-11.3		4	
	=]	11/17/2004	ļ		1				ļ	
	=										
	İ										
NG FORM 18	70		FL/MD\ ROPING 1 DGS\ nevisions 2 3 05\ h-4 dwg	3/23/200		2 AM FS					

		Laur					П	ole No	o. CPU5	<u>-STA5N-C</u>	<u> </u>
DRILLI	NG LOG	DIVI	SION	INSTALLATI	ON					SHEET OF 1	1 Sheet
. PROJECT				10. SIZE	AND TYPE	OF BIT	S	ee rem	narks	Join 1	SHEEL
SFWMD ST		PANSION	DESIGN	11. COORI					DISTURBED	UNDISTUR	RBED
LOCATION CO		.75/F\ Y:	=757827.75(N)	12. MANU	ACTUDEN	C DECIONA	TION OF	ייומת	NAD83	: NG\	/D29
DRILLING AGE	NCY	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-707027.70(11)	Mobile		S DESIGNA	HUN UF	DKILL			
WILLIAMS I		ENCES		13. TOTAL				DISTURE		: UNDISTURBE	
I. BORING DESIG CP05-STA		205						<u>:</u>	9)
. NAME OF DRI		303		14. TOTAL					0		
JOHN				15. ELEVA	TION GROU	JND WATE	: STARTI		3.3Ft.	COMPLETED	
5. DIRECTION OF			,	16. DATE	BORING		: 31AKII	บ 1/17/		11/17/	2004
∨ERTICAL		INCLINED	DEG. FROM VERT.	17. ELEVA	TION TOP	OF BORIN			+15.5		
. THICKNESS OF			N/A Ft.	18. TOTAL	CORE RE	COVERY FO	OR BORING	G			N/A %
. DEPTH DRILLE		·	N/A Ft.	19. SIGNA	TURE AND						
. TOTAL DEPTH	OF HOLE		30.0 Ft.	l			J. Lan	gley, G	eologist		
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)		% REC	BOX OR SAMPLE	RQD OR UD		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
+15.5	0.0		SAND, dark brown, silty (SP-SM)		75	1			SPT Sampler		
7	<u> </u>		Fine, brown					. 47 5		4	9
7	⊬ =				50	2		+13.5	SPT Sampler		
	=		Medium to fine, trace rock						•	14	24
	-∄		Brown to dark brown		50	3		+11,5	SPT Sampler	13	
	_		PIOWH IO GOLK BIOWII		30	J			or i oumpier	4	8
								+9.5		4	
			Medium, dark brown		75	4			SPT Sampler	8 13	
			Red brown to white to light gray to gr	ay,				+7.5		10	23
		FIT	clayey Olive gray to light green to gray, trace	shell	75	5		17.5	SPT Sampler	<u>9</u> 5	
			(-200=9%, w=17%) (SP-SM) '							7 9	16
								+5.5	·	12	
										}	
					67	6			SPT Sampler		
	∄		Light gray, with rock, pebbles and shel	ı				+0.5	•	3	5
			(-200=5.2%, w=26%) (SP-SM)								
						,					
-3.0	18.5									1	
	- 3		CLAYEY SAND, light gray, with limestone	and	44	7			SPT Sampler	- 8	
			shell fragments (-200=21.1%, w=19%)	(SC)				-4.5		10	16
							}				
1											
ļ										i	
			Light brown, fine, silty, trace limestone		100	8			SPT Sampler	2	
į			fragments					-9.5		3	6
							ļ				•
							l				
										İ	
			Gray		100	9			CDT Camel-		
_446	,, <u>,</u> }				100	9		445	SPT Sampler	<u>8</u> 18	71
-14.5	30.0		BORING TERMINATED AT 30 FEET ON					-14.5		13	31
ļ			11/17/2004			ĺ					
	<u>=</u>										
1											

								H	ole No.	CP05-	-STA5N-C	CB-0006
	DRILLI	NG LOG	Div	SION	INSTALLATIO	ON			_		SHEET OF 1	1 Sheet
ŀ	1. PROJECT				10. SIZE A	ND TYPE	OF BIT	Se	e rema	rks	Lor 1	SHEET
l	SFWMD ST		XPANSION	DESIGN	11. COORD	INATE SYS	STEM\DAT			STURBED	UNDISTU	
	2. LOCATION CO FLORIDA		9.80(E).Y	=757822.51(N)	12. MANUF	ACTURER'	S DESIGNA	TION OF	DRILL	NAD83	: NG\	/D29
	3. DRILLING AGE	NCY			Mobile	B53						
	WILLIAMS 4. BORING DESIG		TENCES		13. TOTAL	SAMPLES			DISTURBE	D 9	: UNDISTURBE	
	CP05-STA	SN-CB-C	006		14, TOTAL	NUMBER	CORE BOX	ŒS	•	0	•	'
1	5. NAME OF DRI JOHN	LLER			15. ELEVAT				13	Ft.		
ı	6. DIRECTION OF	HOLE			16. DATE E	BORING		STARTE			OMPLETED	2004
	∨ERTICAL) INCLINED	DEG. FROM VERT.	17. ELEVAT	ION TOP	OF BORIN		1/17/2	+15.0	11/17/: Fi	2004
ļ	7. THICKNESS 0	F OVERBURD	EN	N/A Ft.	18. TOTAL					1 13.0	11.	N/A %
ŀ	8. DEPTH DRILLE		K	4.0 Ft.	19. SIGNAT	URE AND						
ŀ	9. TOTAL DEPTH	OF HOLE	· · · · · · · · · · · · · · · · · · ·	30.0 Ft. CLASSIFICATION OF MATERIALS					gley, Ge	ologist	I	
	ELEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
.	+15.0	0.0	<u> </u>	SAND, medium, light brown, with shell,	with	100	요☆ 1	UD		SPT Sampler	3.5	>
		L, "- <u>=</u>		rock (SP) (FILL)	41111	100	'		•	or i odnibiet	- <u>7</u> - <u>6</u> -	13
	$\overline{7}$	¥ ≣		Fine to medium, tan to white to light	heaur-	83	2		+13.0	SPT Sampler	7	
				(-200=3.1%, w=13%) (SP) Dark brown, silty	prown	63	Z		:	sri Sampier	-7 -8	18
				Dark brown, silty					+11.0		10	E
				Medium, tan to light brown		83	3		,	SPT Sampler	<u>11</u>	29
		_=		Brown to dark brown to black					+9.0		<u>12</u>	
				Light brown, clayey		50	4		3	SPT Sampler	5	
	+7.0	8.0					:		+7.0		2	5 =
Į		_=		CLAYEY SAND, yellow tan (-200=13.7%, w=16%) (SC)		67	5			SPT Sampler	- 5	., [
				(200-10.7%, #-10%) (30)					+5.0		9	13
											10	
												E
												<u> </u>
l				Olive tan (-200=13.4%, w=26%) (SC)		83	6			SPT Sampler		E
				Olive Idn (-200-13.4%, w-26%) (SC)		63	· ·		0.0	ori Sumplei	5	12
ł			///						0.0	······································	6	
			///									E
			///									<u> </u>
ł		-=										E
Ì				Olive gray (-200=13.5%, w=33%) (SC)		100	7			SPT Sampler	2 2	. E
1/20/05				(200) (200, (200,	}				-5.0		2	4 = = :
7												F
6.60			///	-		İ						E:
183		_										Ē
PG	-9.5	24.5		Light gray to white gray, weathered lime	stone	83	8		S	SPT Sampler	0	Ē
215 SFWMD ST5&6.GPJ ACE_1836.GDT	-5.5			and shell LIMESTONE (LS)					-10.0		<u>0</u>	11 = :
STS		∄		,								E
15 SPWMD		_=									:	E.
38615215 11/3/03 SFWM												F.
38	-13.5	28.5		CLAYEY SAND, tan to light gray, with ro	ock	100	9		S	PT Sampler	5	E
	-15.0	30.0		fragments (SC)					-15.0	·	<u>6</u>	12
NO.				BORING TERMINATED AT 30 FEET ON 11/17/2004								
JOB NUM"		=										F
URS J		_	-									
	NG FORM 18	36 GI\296	6\38615215	SFWMD\BORING LOGS\revisions 2_3_05\b-6.de	40 3/23/2I	105 9:00:	50 AM ES	<u>_</u>			i	

		·						Н	ole No.	CP05-	-STA5N-C	B-0007	7
	DRILL	ING LOG	DIV	ISION	INSTALLATI	ON					SHEET	1	.]
ŀ	1. PROJECT				10. SIZE A	ND TYPE	OF BIT	S	ee remar	ks	OF 1	SHEET	1
	SFWMD ST		XPANSION	DESIGN	11. COORD					URBED	UNDISTUR	RBED	1
	2. LOCATION CO		4 21(F) Y:	=757824.01(N)	40. 444,000	A OTUDED!	C DECION	TION OF		NAD83	NG\	√D29	4
I	3. DRILLING AGE	NCY		-7-37-024.01(N)	12. MANUF Mobile		S DESIGNA	ATION OF	DRILL				
	WILLIAMS		IENCES		13. TOTAL				DISTURBED		UNDISTURBE	D	1
	4. BORING DESIG	gnation A5N—CB—0	1007						:	9	: 0)	1
ŀ	5. NAME OF DR				14. TOTAL					0			1
ļ	JOHN				15. ELEVA	TION GROU	JND WATE	R : START	11.5		OMPLETED		4
	6. DIRECTION OF VERTICAL		INCLINED	DEO TROU VERT	16. DATE	BORING			1/18/20		11/18/2	2004	1
ŀ				DEG. FROM VERT.	17. ELEVA	TION TOP	OF BORIN			+15.0			1
- 1	7. THICKNESS O			N/A Ft.	18. TOTAL							N/A %	1
	9. TOTAL DEPTH		·	N/A Ft. 30.0 Ft.	19. SIGNAT	URE AND							
ŀ		T		CLASSIFICATION OF MATERIALS	İ				gley, Geol I	logist			1
ļ	ELEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE	1
ŀ	+15.0	0.0		SAND, dark brown to brown, silty (SP)		50		UD	65	T. C		>	0.0
	T 13.0	0.0		: SAND, dark brown to brown, sitty (SP)		50	1		35	T Sampler	<u>5</u> 6	16	E
				√: 		<u> </u>			+13.0		- <u>7</u>	10	Ē
Ī	7	 		Dark brown to black		75	2		SP	T Sampler	8 10		E 2.5
		¥ <u> </u>		Light brown					+11.0		8	18	E
				Dark brown		75	3		SP	T Sampler	- 8		E 5.0
l				Fine, brown							8 8	16	E-3.0
				Medium, tan to light gray		58	4		+9.0 SP	T Sampler	10		Ē
l		=									<u> </u>	11	7.5
				Light gray Light gray to gray olive, clayey		83	5		+7.0	T Sampler	7		E
1,				Light gray to gray onve, dayey		"	J] "	1 Sumplei	8	15	Ξ
		13.5							+5.0		7 10		10.0
										•			Ē
						i							ŧ
- 1											ŀ		12.5
ŀ	+1.5	13.5	177	CLAYEY SAND, gray with trace shell	-	100	6		CD.	T Sampler		ļ	Ē
				(-200=18%, w=40%) (SC)		100	U			i Sumpler	3	7	ŧ.,,
- 1									0.0		4		E_15.0
ı												J	Ē
- 1			///			İ							E_17.5
													E
				(-200=11.3%, w=29%) (SP-SC)		100	7		SP	T Sampler	2		Ē
705			///						-5.0		-3-4	7	20.0
1/20/05													Ē
Б		<u> </u>			}	ļ						1	F
ACE_1836.GDT		∄											22.5
뒣	-8.5	23.5		LIMESTONE AND SAND, gray, slightly		100	8		co.	T Cl			Ē
G _G				clayey, and weathered limestone fragme	ents	100	0			T Sampler		10	E
ST5&6.GP.		-		(-200=13.8%, w=27%) (SC-LS)	}				-10.0		- 5		<u>=</u> 25.0
S GW												1	Ē
517C		<u> </u>											E - 27.5
38615215 1/3/03 SFWMD		- ≢											Ē.
~		- 3		Some clay, trace shell		100	9		SP	「 Sampler	5		F
<u>7</u> .	-15.0	30.0		DODING TED WAY					-15.0		7 10	17	30.0
NO S				BORING TERMINATED AT 30 FEET ON 11/18/2004		- 1						ł	Ē
CORP LOGS		=		· · · · · · · · · · · · · · · · · · ·								[Ē
ARMY													
	NG FORM 18	36 6/296	5\38615215	SFWMD\BORING LOGS\revisions 2_3_05\b-7.do	#0 3/23/2I	205 9:01:	47 AM ES	<u></u> !	·				ı

							Н	ole No.	CP05-	-STA5N-C	B-000
DRILL	ING LOG	D	VISION	INSTALLATI	ON					SHEET	1
1. PROJECT				10. SIZE	IND TVDC	OF DIT		ee remar	-lea	OF 1	SHEET
SFWMD ST	ΓA 5/6 E	XPANSIO	N DESIGN	11. COORE					TURBED	: UNDISTUR	RED
2. LOCATION CO	ORDINATES			7 555	indic on	o i Em (DA)	OIII		NAD83	•	/D29
		4.02(E),	Y=760460.10(N)	12. MANUF		S DESIGN	ATION OF	DRILL	1111000		
3. DRILLING AGE WILLIAMS		PIENCES		Mobile							
4. BORING DESI		JIENUES		13. TOTAL	SAMPLES	•		DISTURBED	9	UNDISTURBE	
CP05-STA		8000		14. TOTAL	MUMDED	CORE BOY	VEC		0	: U	
5. NAME OF DR	ILLER			15. ELEVA				10.4			
JOHN 6. DIRECTION OF	T HOLE			_ IJ. ELLYA		NU WAIL	: START			OMPLETED	
b. DIRECTION OF] INCLINED	PEC EDOM VEDI	16. DATE	BORING			12/9/200		12/9/2	004
			DEG. FROM VERT	17. ELEVA	TION TOP	OF BORIN	IG		+14.4		
7. THICKNESS O			N/A Ft.	18. TOTAL	CORE RE	COVERY F	OR BORIN	G			N/A %
8. DEPTH DRILLI		:K	N/A Ft.	19. SIGNA	TURE AND	TITLE OF					
9. TOTAL DEPTH	OF HOLE		30.0 Ft.		,		J. Lan	gley, Geo	logist		
ELEVATION	DEPTH	2	CLASSIFICATION OF MATERIALS		%	유유	RQD	1	REMARKS	λ. Η	. 🗷
1		LEGEND	(Description)		REC	BOX OR SAMPLE	OR UD		KEMAKKS	BLOWS/ 0.5 FT-	N- VALUE
+14.4	0.0 =		SAND, fine, dark brown to brown to y	ellow (SP)	50	1		SI	PT Sampler	_ 4	
	=		brown	` '					•	5	11
+12.4	2.0		TOTAL TOTAL					+12.4		<u> </u>	·
	_=		SAND AND PEAT, medium, dark brown, with peat (SP-PT)	, silty,	75	2		Si	PT Sampler	2	
+10.4	4.0		: : : : : : : : : : : : : : : : : : :					+10.4		6	11
110.4	- 1.0 =		SAND, fine, brown (SP)		50	3			PT Sampler	<u>-6</u>	
	=							1			8
+8.4	6.0	2227						+8.4		- 3	
	Ε Ξ		CLAY, brown, sandy, silty, with weathe limestone, very stiff (-200=18.8%, w=	red วว%	100	4		SI	PT Sampler	4	
+6.4	8.0		LL=19%, PI=3%) (CL-LS)	~~~~,				164		8	14
+0.4	=		LIMESTONE AND CLAYEY SAND, tan, (LS	-sc)	100	5	 	+6.4 SI	PT Sampler	10 4	
	! -≣		sandy, weathered limestone	,					·	-3	6
+4.4	10.0							+4.4		- 3	
			SILT, light gray, clayey, soft		[-	
	=]	
	-										
	-]					ł				
			(w=28%, LL=28%, PI=4%) (ML)		100	6		SF	T Sampler	1	
			, , , , , , , , , , , , , , , , , , , ,					-0.6		1	3
	=										
					1						
	=]						
			Gray (w=30%, LL=31%, Pl=6%) (ML)		100	7		SF	T Sampler		
	=		01d) (#=50%, EE=51%, 11=0%) (#E)		,,,,	•			Jumplei	2	
	_=							−5.6		2	4
	_=				1						
:											
	30.0		(700/ 1) 700/ DI 4000 (11)								
	=		(w=36%, LL=36%, Pl=10%) (ML)		100	8		SF	T Sampler	2	
	_=							-10.6		$\frac{1}{2}$	3
										ł	
			 Slightly sandy, stiff	İ	100	9		SP	T Sampler		
15 6	70.0		July Sandy, Sill		.00	•			. Samplet	5	12
-15.6	30.0		BORING TERMINATED AT 30 FEET ON					-15,6		7	12
	-		12/9/2004	İ	ĺ						
NG FORM 18	36 G/29	() 20(150)	SEWMIN RORING DGS\revisions 2 3 05\h-8 o	0 (22 (=	105 9:03	24 44: 5					
אורטו עני ו	1.11 111 291				407						

	· · · · · · · · · · · · · · · · · · ·						Н	lole N	o. CP05-	-STA5N-	CB-0009
DRILLII	NG LOG	DIVI	SION	INSTALLATIO)N					SHEET OF 1	1 Sheet
1. PROJECT				10. SIZE A	ND TYPE	OF BIT	S	ee ren	narks		
SFWMD STA		XPANSION	DESIGN	11. COORDI	INATE SYS	TEM\DAT			DISTURBED	UNDISTU	
		3.27(E).Y=	=757822.49(N)	12. MANUF/	ACTURER'S	DESIGNA	ATION OF	DRILL :	NAD83	: NG	VD29
3. DRILLING AGEN	ICY		(1)	Mobile		CLUION	111011 01	DIVIEL			
WILLIAMS E		CIENCES		13. TOTAL	SAMPLES			DISTUR		: UNDISTURBE	
CP05-STA		0009		14. TOTAL	NIIMRER (CORE BOX	/FS	•	9 0)
5. NAME OF DRIL	LER			15. ELEVAT			-	1	0.8Ft.		
JOHN 6. DIRECTION OF	HOLE			16. DATE B			: START	ED	: C	OMPLETED	
VERTICAL		INCLINED	DEG. FROM VERT.					12/9/		12/9/2	2004
7. THICKNESS OF	OVERBURD	EN	N/A Ft.	17. ELEVAT				20	+14.8	ł1.	N / A . av
8. DEPTH DRILLE	D INTO ROC	К	1.5 Ft.	18. TOTAL 19. SIGNAT							N/A %
9. TOTAL DEPTH	OF HOLE		30.0 Ft.						Geologist		
ELEVATION	DEPTH	9	CLASSIFICATION OF MATERIALS		%	옩띘	RQD		REMARKS	₹	, 35
		LEGEND	(Description)		REC	BOX OR SAMPLE	OR UD		KEMAKNA	BLOWS/ 0.5 FT-	N- VALUE
+14.8	0.0	. 4. 5. 4	SAND, medium, brown, with rock fragm	ents (FILL)	100	1			SPT Sampler	6	
					İ					<u>6</u> 5	11
			Fine, brown to light brown to tan and	black to	67	2		+12.8	SPT Sampler	<u> </u>	
7	7		dark brown							9 9	18
-\	7		(-200=2.9%, w=20%) (SP) Tan to white to black to dark brown, s	ilty	100	3		+10.8	SPT Sampler	- 9	
	=		Light brown to brown	,					•	- <u>6</u>	13
	_=		Yellow brown to dark brown		50	4		+8.8	SPT Sampler		
	_				50	7			or i bampio	4	10
		1	Light brown to tan					+6.8	ODT O	<u> </u>	
	_=		White, with limestone fragments, trace	shell	75	5			SPT Sampler	<u>6</u> 10	19
		y y	Clayey					+4.8		<u>9</u> 7	13
										·	
							ļ				
	. =										
+1.3	13.5	/ / /	CLAYEY CAND Bold many with Burnelson		78	c	1		SPT Sampler		
			CLAYEY SAND, light gray, with limestone fragments (-200=10.4%, w=30%) (SP-SC)		/6	6			ari admpler		4
İ	=	44/	(-200=10.4%, w=30%) (SP-SC)					-0.2	•	2	
	=	////						•			
	=				1						
	=		Gray (−200=8.6%, w=31%)		100	7			SPT Sampler	1	
	=			-				-5.2			2
1				ļ							
				İ							
İ			With trace shell (-200=26.3%, w=25%)	(sc)	100	8			SPT Sampler	2	
			(232 2000, 2000,			_		-10.2		2	6
				Ī						4	
ļ							·]			
		///]			
-13.7	28.5				ļ						
			LIMESTONE, gray, weathered, with clay (Without clay	LS)	100	9			SPT Sampler	109	
-15.2	30.0		BORING TERMINATED AT 30 FEET ON					-15.2		11	20
I	=		12/9/2004	į							
					,	1	1				

			_					Н	ole N	lo. CP05-	-STA5N-(CB-0010)
	DRILLI	NG LOG	DIVI	SION	INSTALLATI	ON					SHEET	1	
	1. PROJECT				10. SIZE /	ND TYPE	OF RIT		ee rer	marks	of 1	SHEET	
	SFWMD ST		(PANSION	DESIGN	11. COORE					DISTURBED	: UNDISTU	RBED	
	2. LOCATION CO		3 95(E) V-	=757824.48(N)	<u></u>		· ·		<u> </u>	NAD83	: NG	VD29	
	3. DRILLING AGE		3.03(L),1-	-737024.40(N)	12. MANUF Mobile		S DESIGNA	ATION OF	DRILL				
	WILLIAMS I		IENCES		13. TOTAL				DISTUR		UNDISTURBE		
	4. BORING DESIGNATION OF CPO5-STA		010						:	9	<u>:</u> (0	
	5. NAME OF DRI				14. TOTAL 15. ELEVA					0 0.7 Ft.			
	JOHN 6. DIRECTION OF	HOLE					NU WAIL	: START			OMPLETED:		l
	VERTICAL		INCLINED	DEG. FROM VERT.	16. DATE	BORING		<u> </u>	12/9/	2004	12/9/2	2004	l
	7. THICKNESS O			N/A Ft.	17. ELEVA					+13.7 F	Ft		
	8. DEPTH DRILLE	D INTO ROCK	····································	1.5 Ft.	18. TOTAL 19. SIGNAT							N/A %	
	9. TOTAL DEPTH	OF HOLE		30.0 Ft.	19. SIGNA	OKE AND				Geologist		l	
	ELEVATION	DEPTH	9	CLASSIFICATION OF MATERIALS	·	%		RQD				ᆔ	
		52	LEGEND	(Description)		RÉC	BOX OR Sample	OR UD		REMARKS	BLOWS/ 0.5 FT-	N- VALUE	١,
	+13.7	0.0		SAND, dark brown to brown, silty		83	1			SPT Sampler	5		L 0.
											7 8	15	Ē
		=		(-200=1.1%, w=13%) (SP)		67	2		+11.7	SPT Sampler			2.5
	7	Z 📑		(255 - 1176, 11 - 1576) (517						•	<u>7</u>	15	F
						67	3		+9.7	SPT Sampler	7		Ē
		_=		Madison to fine busses						or r campion	5	10	5.
	+7.7	6.0	///	Medium to fine, brown CLAYEY SAND, brown tan to greenish gi		100	4		+7.7	CDT C	- 5		Ē
				CLATET SAND, Brown Idn to greenish gi	dy	. 100	4			SPT Sampler	-4 7	19	Ē,
		_=							+5.7		12		<u>-</u> 7.
	:		11/	Brown, with rock, trace shell (-200=23.5%, w=16%) (SC)		100	5			SPT Sampler	65	40	Ē
				(-200=23.5%, w=16%) (SC) White gray, with rock fragments					+3.7		- 5	10	= 10
ı			///										Ē
	+1.7	12.0										· •	Ē
				LIMESTONE AND SAND, gray to light gra	у,								-12
				weathered limestone, trace clay, with st (LS-SP)	1e)i	67	c			CDT CI			Ē
				(23-31)		67	6		4.7	SPT Sampler	<u>6</u> _ 5	8	F.,
		1	ᆂ				-		-1.3		3		<u>-</u> 15
ı													Ē
		=	그		:								E 17
	-4.8	18.5	귀										Ē
				LIMESTONE, gray, weathered, with shell l Dark gray, trace clay	(LS)	100	7			SPT Sampler	4		Ē
/20/02	-6.3	20.0		LIMESTONE AND SAND, pebble to coarse,					-6.3		11 16	27	20
1/20				gray, clayey, weathered (LS-SP)								f	Ē
19							:						<u> </u>
1836.GDT												ŀ	<u>-</u> 22 -
ĄĢ		=	一日			67	8			SPT Sampler	8		Ē
G						-			-11.3			18	- - 25.
ST5&6.GP.			一					٠,			°		 E
Ş.												ŧ	Ē
3.5			用									Ī	27.
11/3/03 SFWMD		=			İ							ŀ	<u>-</u>
=1	4.5		++	Tan, with shell		100	9			SPT Sampler	119	_, [-
ξ ω [-16.3	30.0		BORING TERMINATED AT 30 FEET ON					-16.3		12	21	30.
CORP LOGS		=		12/9/2004									<u>.</u>
3g.	-	=											<u>-</u>
	NC FORM (5	7.0								···			
Ł	NG FORM 18.	Jb G:\29	96\38615215	SSFWMD\BORING LOGS\revisions 2_3_05\b-10	dwg 3/23.	/2005 9:	05:07 AM	EST					

				<u> </u>	lole N	<u>lo. CP05</u>	<u>-STA5N-(</u>	<u>CB-0011</u>
DRILLING LOG DIVISION	INSTALLAT	ION					SHEET	1
1. PROJECT	10 075	AND TYPE	OC DIT				OF 1	SHEET
SFWMD STA 5/6 EXPANSION DESIGN	10. SIZE	AND TYPE			ee ren	DISTURBED	: UNDISTUR	חחרת
2. LOCATION COORDINATES	11. COOK	DINAIL SI	SIEM/DAI	UM		NAD83		/D29
FLORIDA X=679881.24(E),Y=757817.89(N)	12. MANU	FACTURER'	S DESIGNA	ATION OF	DRILL	NADOJ	NO	1023
3. DRILLING AGENCY		B53						
WILLIAMS EARTH SCIENCES 4. BORING DESIGNATION	13. TOTAL	SAMPLES			DISTUR		UNDISTURBE	
CP05—STA5N—CB—0011					:	9	: ()
5. NAME OF DRILLER		NUMBER				0		
JOHN	15. ELEVA	TION GROU	JND WATE			.8 Ft.		
6. DIRECTION OF HOLE	16. DATE	BORING		: STAR1	ED 12/9/:		OMPLETED 12/9/2	2004
VERTICAL INCLINED DEG. FROM VE	RT. 17. ELEVA	TION TOD	OF BODIN		12/3/	+13.3		.004
7. THICKNESS OF OVERBURDEN N/A Ft.	17. CELVA				10	T13.3	F1.	11/4 0
8. DEPTH DRILLED INTO ROCK N/A Ft.	19. SIGNA							N/A %
9. TOTAL DEPTH OF HOLE 30.0 Ft.	19. 3IGNA	TORE AND				Geologist		
		Τ Ι			1	70010g.01	\	
ELEVATION DEPTH S CLASSIFICATION OF MATERIALS (Description)		REC	BOX OR SAMPLE	RQD OR	}	REMARKS	BLOWS/ 0.5 FT-	N- VALUE
		1	88	UD		v=	∃3;	>
+13.3 0.0 CLAYEY SAND, brown, with shell (SC)		83	1			SPT Sampler	6	
H11.3 2.0 Brown to dark brown, silty				ľ				16
+11.3 2.0 Medium, tan SAND, fine, light brown (SP)		75	2		+11.3	SPT Sampler	119	
Janu, mie, ngm brown (3r)			•		-		9	18
		<u> </u>		ļ	+9.3		9 8	
Medium, light brown to brown		88	3			SPT Sampler	- 6	E
Brown to dark brown							11	21
+7.3 6.0 CLAYEY SAND, dark greenish gray, s	andv	75	4	<u> </u>	+7.3	SPT Sampler	<u>6</u> 2	[
with shell	2.1.07,		·			or r complet	4	8
+5.3 8.0 (-200=19.7%, w=17%) (SC)					+5.3		-4-	8
LIMESTONE AND CLAYEY SAND, gray		100	5			SPT Sampler	5	
weathered limestone, with shell, with limestone pebbles (LS-SP)					ł		7 8	15
innesione pennies (ES-Si)					+3.3		5	
								Ė
								E
							j	
		100	6			SPT Sampler	11	F
					-1.7		9	16
		}						
								<u> </u>
								F
								ŀ
		100	7			SPT Sampler		F
White to light gray, with rock fragm	ents]	·		6.7		4	7
					-6.7		3	
								-
							ŀ	E
					I		i	E
-10.2 23.5								
CLAYEY SAND, tan to light brown, tro	ce shell	100	8			SPT Sampler	2	Ē
	ce shell	100	8		-11.7	SPT Sampler	2 3 4	7
CLAYEY SAND, tan to light brown, tro	ce shell	100	8		-11.7	SPT Sampler	2 34	7
CLAYEY SAND, tan to light brown, tro	ce shell	100	8		-11.7	SPT Sampler	2 34	7
CLAYEY SAND, tan to light brown, tro	ce shell	100	8	·	-11.7	SPT Sampler	2 3 4	
CLAYEY SAND, tan to light brown, tro	ce shell	100	8		-11.7	SPT Sampler	2 3 4	7
CLAYEY SAND, tan to light brown, tro	ce shell				-11.7		2 3 4	
CLAYEY SAND, tan to light brown, tro (-200=22.7%, w=27%) (SC) Gray to dark gray	ce shell	100	9			SPT Sampler SPT Sampler	2 3 4	
CLAYEY SAND, tan to light brown, tro (-200=22.7%, w=27%) (SC) Gray to dark gray	ce shell				-11.7 -16.7		2 3 4	
CLAYEY SAND, tan to light brown, tro (-200=22.7%, w=27%) (SC) Gray to dark gray	ce shell						2 3 4	
CLAYEY SAND, tan to light brown, tro (-200=22.7%, w=27%) (SC) Gray to dark gray BORING TERMINATED AT 30 FEET ON	ce shell						2 3 4	
CLAYEY SAND, tan to light brown, tro (-200=22.7%, w=27%) (SC) Gray to dark gray BORING TERMINATED AT 30 FEET ON	ce shell						2 3 4	

		DIVI	ISION	INSTALLATIO	nN -		Н	ole No	cP05-	-STA5N-(I sheet	CB-0012
DRILLI	NG LOG		SION	INSTALLATIO	DIA					OF 1	i Sheet
1. PROJECT				10. SIZE A	ND TYPE	OF BIT	S	ee rem	arks	101 1	JILLI
SFWMD ST		PANSION	DESIGN	11. COORD					DISTURBÉD	: UNDISTUI	RBED
2. LOCATION CO		4.4/=\ \	757047 70(1)	Ì		·			NAD83		VD29
3. DRILLING AGE		.14(£),Y=	=757817.38(N)	12. MANUF		S DESIGNA	ATION OF	DRILL			•
WILLIAMS		FNCES		Mobile 13. TOTAL				DICTUDE	FD	UNDICTUDDE	70
4. BORING DESIG		LITOLO		IS. IUIAL	SAMPLES			: Disture	9	UNDISTURBE	.u.)
CP05-STA)12		14. TOTAL	NUMBER	CORE BOX	ŒS		0	•	
5. NAME OF DRI	LLER			15. ELEVAT				9	Ft.		
JOHN 6. DIRECTION OF	HULE						: START			OMPLETED	
VERTICAL		INCLINED	DEG. FROM VERT.	16. DATE E	BORING		:	12/9/2	2004	12/9/2	2004
7. THICKNESS OF				17. ELEVAT	TON TOP	OF BORIN	G		+12.0	Ft.	
8. DEPTH DRILLE			N/A Ft. 7.0 Ft.	18. TOTAL	CORE RE	COVERY F	OR BORIN	G			N/A %
9. TOTAL DEPTH				19. SIGNAT	URE AND						
9. IOIAL DEFIN	OF HOLE		30.0 Ft.				J. Lan	gley, G	eologist		
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
		2			REG	8 S S	ÜĎ			BLO 0.5	2 ₹
+12.0	0.0		SAND, fine, brown to dark brown black	, silty,	58	1			SPT Sampler	6	
			trace shell (SP)				l			4	10
-	├ <u>चे</u>		}		83	2		+10.0	SPT Sampler	10	
Ž	<u> </u>		Brown to tan		[-			Dampioi	4	7
+8.0	4.0							+8.0		3	
	= ==		LIMESTONE, brown to tan, weathered, wi shell, some clay (LS)	ith	100	3			SPT Sampler		
+6.0	6.0		Silen, Solite Glay (LS)							3	5
+6.0	0.0		LIMESTONE AND SAND, gray, weathered,		50	4		+6.0	SPT Sampler	7	
	=		with shell (-200=12.4%, w=14%) (LS-S	c)					,	- 5	16
	₽	귀	Clayey sand	1				+4.0		10 77	
	` ≡	퓌	Caorse to medium, gray to tan		75	5			SPT Sampler	6	
	=	긔								3	6
	=							+2.0		6	
		그 :									
	=										
		그님: : !									
-1.5	13.5		UMETONE white to tight many almost	(16)	100	c			CDT CI		
	-		LIMESTONE, white to light gray, clayey, (weathered, trace shell	(LS)	100	6			SPT Sampler	$-\frac{7}{6}$	40
	-3		,	}				-3.0		6	12
	=										
ļ	<u>=</u>	1									
	=						l				
-6.5	18.5				İ						
			CLAYEY SAND, fine, gray (-200=19.2%, w=27%) (SC)		100	7			SPT Sampler	- 2	
	_		(200-13.2%, #-27%) (30)	ļ				-8.0		2	5
İ	_=			1							
İ	■				i						
ł											
	===		With about	ļ	100	8			SPT Sampler	2	
	<u>_</u>		With shell	1				-13.0		4	8
İ	P.	///		ſ	T						
	3			l			į			-	
		///			ŀ		I				
					ĺ	į	1				
					100	9			SPT Sampler	2	
-18.0	30.0		Trace shell		100	9		_18 O	SPT Sampler	2_4_	8
-18.0	30.0		BORING TERMINATED AT 30 FEET ON		100	9		-18.0	SPT Sampler	2	8
-18.0	30.0				100	9		-18.0	SPT Sampler		8
-18.0	30.0		BORING TERMINATED AT 30 FEET ON		100	9		-18.0	SPT Sampler		8

		·					Но	le No.	CP05-	-STA5N-(CB-001
DRILLI	ING LOG	DI	VISION	INSTALLATI	ON					SHEET OF 1	1
1. PROJECT		L_		10. SIZE /	AND TYPE	OF BIT	Se	e remarl	vs.	OF 1	SHEET
SFWMD ST		XPANSIOI	N DESIGN	11. COORE					URBED	: UNDISTUI	RBED
2. LOCATION CO		8 77(F) \	Y=757817.00(N)	40 1411111	LATURER	'o project	171011 05 5	:	NAD83	- NG	VD29
3. DRILLING AGE	NCY		1-107017.00(N)	Mobile		'S DESIGN	ATION OF D	RILL			
WILLIAMS		CIENCES		13. TOTAL			:	DISTURBED		: UNDISTURBE	D
4. BORING DESIGNATION OF THE CP05-STA		0013					:)	. ()
5. NAME OF DRI		7010		14. TOTAL					0		
JOHN 6. DIRECTION OF	- 1101 5			15. ELEVA		UND WATE	:R ; STARTE(8.7 F		OMPLETED	
6. DIRECTION OF SERVICAL		INCLINED	DEG. FROM VERT.	16. DATE	BORING			, 2/9/200		12/9/2	2004
7. THICKNESS O				17. ELEVA	TION TOP	OF BORIN	1G		+12.2		
8. DEPTH DRILLE			N/A Ft. N/A Ft.				OR BORING				N/A %
9. TOTAL DEPTH			30.0 Ft.	19. SIGNAT	TURE AND	TITLE OF	INSPECTOR		:-1		
			CLASSIFICATION OF MATERIALS	<u> </u>	ſ	C 111	T	ley, Geol	ogist		
ELEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N− VALUE
+12.2	0.0 =		SAND, fine, brown to dark brown to b		58	83	UD	CD:	T C1		
112.2	0.0 =		(SP)	iack, silty	36	'		24	T Sampler	<u>5</u> <u>5</u>	12
	_=							10.2		<u>7</u>	12
7	├ <u>-</u>				58	2		SP	T Sampler		
			Tan, clayey, with shell (-200=14%, w=16%) (SC)					+8.2		- 12 - 12	22
			1 (200-17%, #-10%) (30)		75	3			T Sampler	- 6	
							, !			<u> </u>	14
	=		Coarse to medium, tan olive clayey, wi	th shell	100	4	1	+6.2 SP1	Sampler	- 7 - 6	
			1		1				·	<u>6</u> 12	18
		$/_{YY}$	Coarse, tan, trace shell, limestone frag	monte	100	5		+4.2	Γ Sampler	14	
			de de la la la la la la la la la la la la la	11161117	100	,		311	Jumpler	4	9
			4					+2.2		<u>5</u>	
			Common aliabeth alassos and about			_		cn.			
			Coarse, gray, slightly clayey, and shell (-200=2.6%, w=22%) (SP)		100	6			Sampler	<u>4</u> 15	20
								-2.8		13	28
	=======================================										
				,						l	
			Madium to fine election								
			Medium to fine, slightly clayey, with pe limestone	DDIE	100	7		SPT	Sampler	7	
			.]					-7.8		- <u>6</u> 7	13
			<u>}</u>	ĺ	7						
		na kana									
-11.3	23.5	٠,٠٠٠									
	=		CLAYEY SAND, gray, trace shell, and ro (-200=18.7%, w=25%) (SC)	ck	67	8		SPT	Sampler	4 3	
			, <u></u> , (<u></u> ,				-1	12.8		4	7
^			1	İ							
	_₫		1								
	_=			-							
	<u> </u>	11	1	}	100	9		SPT	Sampler		;
	_ ⊒	7: 7: 7			.00	-	1	JI 1	Samplet		
-17.8	30.0		1	ł	i		l a	7 9			י א
-17.8	30.0		BORING TERMINATED AT 30 FEET ON					7.8		4	8
-17.8	30.0		BORING TERMINATED AT 30 FEET ON 12/9/2004					7.8		4	
-17.8	30.0		BORING TERMINATED AT 30 FEET ON 12/9/2004					7.8		4	8

DRILLING LOS STA CAR EXPANSION DESIGN 10. 32% AND THE OF BIT SEE PROMISS SOURCE STAT								H	ole N	<u>о. СРО5-</u>		B-0014
1. PRODUCT STAMP STA 5/6 EXPANSION DESIGN 10. SZZ AND TPTE 07 811 See Permorks 11. Coloribatis STRING/RUM 105108850 9000198850 11. Coloribatis STRING/RUM 105108850 9000198850 11. Coloribatis STRING/RUM 105108850 9000198850 11. Coloribatis STRING/RUM 105108850 9000198850 11. Coloribatis STRING/RUM 10. SALE	DRILL	ING LOG	DIVI	SION	INSTALLATIO	ON					SHEET	1
CASHANI CARRIED CASHANI CA					10 5175 4	ND TYPE	OF DIT				OF I	SHEET
2. DECATION CONSIDERATES FLORING AS A SEQUENCE 1.5 TOTAL NAMES 1.5 TOTAL SWAPE 1.5 TOTAL SWAP	1	TA 5/6 EXP	ANSION	DESIGN							· HADISTHE	RED
10 10 10 10 10 10 10 10	2. LOCATION CO	OORDINATES			11. COOKD	,	IIEM (DAI	/m	:			
MILLIANS EARTH SCIENCES 13. TOTAL SAMPLES DISTINGED UNDISTINGED			53(E),Y:	=757817.55(N)	1		DESIGNA	TION OF	DRILL	1,11,10,00		0.20
4 - BORNE DESCRIPTION 1.6 TOTAL NAMBER CORE COURS 0			MCEC									
14, TOTAL SHAREFT CORE BOXES 0			INCES		13. TOTAL	SAMPLES			: distur :			
S. HANK OF INCLET JOHN S. DRECTRON OF HOLE S. DRECTRON OF			14		14 TOTAL	МНИВЕВ	CODE DOV	re	· 		· ·	,
15. DATE BORNS SARTED COMPLETED	1	RILLER										
12/9/2004 12/9					15. ELEVAI	IION GROU	IND WAIE				OMPLETED	
The Interest of Coles Report 1.7 File Number 1.7 File Number 1.7 File Number 1.8 1.5			101 11150	DEC. FROM VERT	16. DATE I	BORING						.004
8. BEFTH ROHELES NOTO BOOK 9.5 FI. 10. TOTAL BEFTH OF HOLE 30.0 FI. 11. SONAIUSE AND ITLE OF SECTION 11. SONAIUSE AND ITLE OF SECTION 12. SONAIUSE AND ITLE OF SECTION 13. Longley, Geologist CLASSPEATION OF MATERIALS (Description) 14. SEC. \$\frac{35}{25}\frac{3}{25}\fra					17. ELEVAT	TION TOP	OF BORIN	G		+11.7	F l .	
9. TOTAL BEPTH OF HOLE SUBSTITUTE OF MATERIALS CLASSIFICATION OF MATERIALS CCOCKS. from reliev, with rock and shell ESS 1 110. 3 SPT Sompler 111. 45.7 SPT Sompler 112. 21 LIMESTON AND SAND, for to yellow to groy, troce shell, woothered (~200=16.6%, w=13%) (LS~SC) Cocks to medium, while to light groy, clayey LIMESTON AND SAND, for to yellow to groy, troce shell, woothered (~200=16.6%, w=13%) (LS~SC) Cocks to medium, while to light groy, clayey LIMESTON AND SAND, for to yellow to groy, troce shell, woothered (~200=16.6%, w=13%) (LS~SC) Cocks to medium, while to light groy, clayey LIMESTON AND SAND, for to yellow to groy, troce shell, woothered (~200=16.6%, w=13%) (LS~SC) Cocks to medium, while to light groy, clayey LIMESTON AND SAND, for to yellow to groy, troce shell, woothered (~200=16.6%, w=13%) (LS~SC) Cocks to medium, while to light groy, clayey LIMESTON AND SAND, for to yellow to groy, troce shell, woothered (~200=16.6%, w=13%) (LS~SC) Cocks to medium, while to light groy, clayey LIMESTON AND SAND, for to yellow to groy to grow to gro				· · · · · · · · · · · · · · · · · · ·	18. TOTAL	CORE REC	COVERY FO	OR BORING	3			N/A %
CLASSECATION DEPTH					19. SIGNAT	URE AND						
### (Bescription) #### (Bescription) ####################################	9. TOTAL DEPTH	I OF HOLE		T	<u> </u>	,		J. Lan	gley, (Geologist		
#11.7 0.0 SAND, brown, clayey, silly, with rock and shell pebbles SFT Sampler 4 10.4 5.5 5	ELEVATION	DEPTH	S	= 1			문공			DEMARKS	λ. - Τ	၂병
#11.7 0.0 SAND, brown, clayey, silly, with rock and shell pebbles SFT Sampler 4 10.4 5.5 5			9931	(Description)		REC	SAM			KEMAKKS	8L0v	ŻΑ
10.2 1.5 Oper brown to brown Direct State Spi Sampler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Sulf Spi Sumpler Spi Sumpler Sulf Spi Sumpler Spi Sumpler Sulf Spi Sumpler Spi Sumpler Spi Sumpler Spi Sumpler Spi Sumpler Spi Spi Sumpler Spi Spi Sumpler Spi Sumpler Spi Spi Sp	+11.7	0.0		SAND, brown, clayey, silty, with rock ar	nd shell	83				SPT Sampler	4	
MKSSTORE, grey, with shell, trace clay (LS) 100 3 100 100 3 10	+10.2	1.5							+10.4		5	>50
### 1.50 ### 2.					(LS)				+9.4	CDT C '		
## 45.7 6.0	7	│		, , , , , , , , , , , , , , , , , , , ,	. ,	56	/2			Sri Sampler	50/3.5"	>50
## 45.7 6.0		¥ <u> </u>										
45.7 6.0 SAND WITH CLAY, coarse, ton, slifty (SC) 45.7 12 17 17 17 17 17 17 1	+7.2	4.5			d, ,	100	3			SPT Sampler	6	
UMESTONE AND SAND, tan to yellow to gray, froce shell, weathered, soft (w=32%, LL=47%, Pi=22%) (CL) UMESTONE, dark gray, clayey weathered, soft (w=32%, LL=47%, Pi=22%) (CL) UMESTONE, dark gray, clayey, weathered, soft (w=32%, LL=47%, Pi=22%) (CL) UMESTONE, gray, slightly clayey, weathered (LS) Test and some standard shell (LS) Test and some standard shell (LS) Test and some standard shell (LS) Test and some standard shell (LS) Test and some standard shell (LS) Test and some standard shell (LS) Test and some standard shell (LS) Test and some standard shell (LS) Test and some standard shell (LS) Test and				trace shell								21
-1.8 13.5 LIMESTONE, dark gray, clayey, weathered, colaroneu (w=32x, LL=47x, Pl=22x) (CL) LIMESTONE, dark gray, clayey, weathered, soli (w=32x, LL=47x, Pl=22x) (CL) LIMESTONE, gray, slightly clayey, abundant shell (LS) LIMESTONE, gray, slightly clayey, weathered (LS) LIMESTONE, gray, slightly clayey, weathered (LS) Results of the color of the	+5.7	6.0		1)	70			+5.7	COT C 1	17	
-1.8 13.5 LIMESTONE AND SAND, tan to yellow to gray, trace shell, weathered (-200=16.6%, w=13%) (LS-SC) LIMESTONE AND SAND, tan to yellow to gray, trace shell, weathered (-200=16.6%, w=13%) (LS-SC) Coarse to medium, white to light gray, clayey Clay, bluish green, trace shell, trace rock, weathered, soff (w=32%, LL=47%, Pl=22%) (CL) SPT Sampler 2				tan, weathered, trace shell		/5	4			SPI Sampler		
Coarse to medium, tan to gray 83 5 SPT Sampler R 6 12 +1.7 8 1.8 13.5 LIMESTONE AND SAND, tan to yellow to gray, trace shell, weathered (-200=16.6%, w=13%) (LS-SC) Coarse to medium, white to light gray, clayey CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) -11.8 23.5 LIMESTONE, dark gray, clayey, weathered, calcareous (w=39%, LL=43%, Pl=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 -16.8 3 5 SPT Sampler R 6 12 -10 6 SPT Sampler Q -3.3 LIMESTONE, dark gray, clayey, weathered, calcareous (w=39%, LL=43%, Pl=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 -16.8 3 5 SPT Sampler R 6 6 12 -10 6 SPT Sampler Q -13.3 20 SPT Sampler 3 -13.5 -13.5 SPT Sampler 3 -13.5 -13.5 SPT Sampler 3 -13.5 -13.5 SPT Sampler 3 -13.5 -13.5 SPT Sampler 3 -13.5 -13.5 SPT Sampler 3 -13.5 -13.5 -13.5 SPT Sampler 3 -13.5 -13.5 -13.5 SPT Sampler 3 -13.5 -13.5				(-200=24.3%, w=18%) (LS-SC)					+37			11
-1.8 13.5 LIMESTONE AND SAND, tan to yellow to groy, trace shell, weathered (-200=16.6%, w=13%) (LS-SC) Coarse to medium, while to light gray, clayey CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) SPI Sampler 2				Coarse to medium, tan to gray		83	5		13.7	SPT Sampler	8	
-1.8 13.5 LIMESTONE AND SAND, ian to yellow to gray, trace shell, weathered (-200=16.6%, w=13%) (LS-SC) Coarse to medium, while to light gray, cloyey 100 7 SPI Sampler 2 -3.3 10 23 23 23 23 23 23 23 2	1	- 3 /		- ·							6	12
LIMESTONE AND SAND, ton to yellow to gray, trace shell, weathered (-200=16.6%, w=13%) (LS=SC) Coarse to medium, white to light gray, clayey CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) SPT Sampler 2									+1.7		6	
LIMESTONE AND SAND, ton to yellow to gray, trace shell, weathered (-200=16.6%, w=13%) (LS=SC) Coarse to medium, white to light gray, clayey CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) SPT Sampler 2							٠					
LIMESTONE AND SAND, ton to yellow to gray, trace shell, weathered (-200=16.6%, w=13%) (LS=SC) Coarse to medium, white to light gray, clayey CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) SPT Sampler 2												
LIMESTONE AND SAND, ton to yellow to gray, trace shell, weathered (-200=16.6%, w=13%) (LS=SC) Coarse to medium, white to light gray, clayey CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) SPT Sampler 2												
gray, trace shell, weathered (-200=16.6%, w=13%) (LS-SC) Coorse to medium, white to light gray, clayey	-1.8	13.5									j	
-6.8 18.5 CLAY, bluish green, trace shell, trace rock, wedthered, soft (w=32%, LL=47%, Pl=22%) (CL) -11.8 23.5 LIMESTONE, dark gray, clayey, wedthered, calcareous (w=39%, LL=43%, Pl=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 LIMESTONE, gray, slightly clayey, wedthered (LS) -18.3 30.0 BORING TERMINATED AT 30 FEET ON 100 7 SPI Sampler 2 -8.3 2 4 -100 8 SPI Sampler 3 -13.3 10 20 SPI Sampler 11 -18.3 30.0 SPI Sampler 3 -18.3 12 23						100	6			SPT Sampler		
CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) LIMESTONE, dark gray, clayey, weathered, calcareous (w=39%, LL=43%, Pl=15%) Slightly clayey, abundant shell (LS) LIMESTONE, gray, slightly clayey, weathered (LS) BORING TERMINATED AT 30 FEET ON 100 7 SPT Sampler 2 -8.3 4 -18.3 SPT Sampler 3 7 -13.3 20 SPT Sampler 11 LIMESTONE, gray, slightly clayey, weathered (LS) -18.3 BORING TERMINATED AT 30 FEET ON 12/9/2004			\square		0%,				-3.3		13 10	23
-6.8 18.5 CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) -11.8 23.5 LIMESTONE, dark gray, clayey, weathered, calcareous (w=39%, LL=43%, Pl=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 LIMESTONE, gray, slightly clayey, weathered (LS) -16.8 28.5 BORING TERMINATED AT 30 FEET ON 12/9/2004 BORING TERMINATED AT 30 FEET ON 12/9/2004					clayey						j	
CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) -11.8 23.5 LIMESTONE, dark gray, clayey, weathered, colcareous (w=39%, LL=43%, Pl=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 -18.3 SPT Sampler 2 -8.3 4 SPT Sampler 3 -7 -13.3 20 SPT Sampler 1 -18.3 SPT Sampler 3 -13.3 20 SPT Sampler 1 -18.3 SPT Sampler 3 -18.3 12 23					, ,							
CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) -11.8 23.5 LIMESTONE, dark gray, clayey, weathered, colcareous (w=39%, LL=43%, Pl=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 -18.3 SPT Sampler 2 -8.3 4 SPT Sampler 3 -7 -13.3 20 SPT Sampler 1 -18.3 SPT Sampler 3 -13.3 20 SPT Sampler 1 -18.3 SPT Sampler 3 -18.3 12 23						ŀ						,
CLAY, bluish green, trace shell, trace rock, weathered, soft (w=32%, LL=47%, Pl=22%) (CL) -11.8 23.5 LIMESTONE, dark gray, clayey, weathered, colcareous (w=39%, LL=43%, Pl=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 -18.3 SPT Sampler 2 -8.3 4 SPT Sampler 3 -7 -13.3 20 SPT Sampler 1 -18.3 SPT Sampler 3 -13.3 20 SPT Sampler 1 -18.3 SPT Sampler 3 -18.3 12 23	-6.R	185世	\square									
-11.8 23.5 Limestone, dark gray, clayey, weathered, calcareous (w=39%, LL=43%, Pl=15%) Slightly clayey, abundant shell (LS) SPT Sampler 3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7			///	CLAY, bluish green, trace shell, trace ro	ock,	100	7			SPT Sampler	2	
-11.8 23.5 LIMESTONE, dark gray, clayey, weathered, colcareous (w=39%, LL=43%, Pl=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 LIMESTONE, gray, slightly clayey, weathered (LS) -18.3 30.0 BORING TERMINATED AT 30 FEET ON 100 8 SPT Sampler 3 7. 20 -13.3 SPT Sampler 11 11. 11. 23									-8.3		- 2	4
LIMESTONE, dark gray, clayey, weathered, calcareous (w=39%, LL=43%, PI=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 -18.3 BORING TERMINATED AT 30 FEET ON 12/9/2004 Calcareous (w=39%, LL=43%, PI=15%) Slightly clayey, weathered (LS) Calcareous (w=39%, LL=43%, PI=15%) Calcareous (w=39%, LL=		3		(W-32%, LL-47%, FI-22%) (CL)							*	
LIMESTONE, dark gray, clayey, weathered, calcareous (w=39%, LL=43%, PI=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 -18.3 BORING TERMINATED AT 30 FEET ON 12/9/2004 Calcareous (w=39%, LL=43%, PI=15%) Slightly clayey, weathered (LS) Calcareous (w=39%, LL=43%, PI=15%) Calcareous (w=39%, LL=			///								1	
LIMESTONE, dark gray, clayey, weathered, calcareous (w=39%, LL=43%, PI=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 -18.3 BORING TERMINATED AT 30 FEET ON 12/9/2004 Calcareous (w=39%, LL=43%, PI=15%) Slightly clayey, weathered (LS) Calcareous (w=39%, LL=43%, PI=15%) Calcareous (w=39%, LL=												
LIMESTONE, dark gray, clayey, weathered, calcareous (w=39%, LL=43%, PI=15%) Slightly clayey, abundant shell (LS) -16.8 28.5 -18.3 BORING TERMINATED AT 30 FEET ON 12/9/2004 Calcareous (w=39%, LL=43%, PI=15%) Slightly clayey, weathered (LS) Calcareous (w=39%, LL=43%, PI=15%) Calcareous (w=39%, LL=		"_ゴ/	///									ı
-16.8 28.5 Calcareous (w=39%, LL=43%, Pl=15%) Calcareous (w=39\%, LL=43%, Pl=15%)	-11.8	 25.5 	++	LIMESTONE, dark grav. clavev. weathered	<u> </u>	100	8			SPT Sampler		
-16.8 28.5 LIMESTONE, gray, slightly clayey, weathered (LS) 78 9 SPT Sampler 11 11 123 12 13 14 15 15 15 15 15 15 15			7	calcareous (w=39%, LL=43%, Pl=15%)	-		-		17.7			20
LIMESTONE, gray, slightly clayey, weathered (LS)			++	Slightly clayey, abundant shell (LS)					13.3		13	
LIMESTONE, gray, slightly clayey, weathered (LS)		事						ļ				
LIMESTONE, gray, slightly clayey, weathered (LS)			+									
LIMESTONE, gray, slightly clayey, weathered (LS)		事			i							
-18.3 30.0 -18.3 -11 23 -18.3 -12 23 -18.3 -12 23 -18.3 -19/2004	-16.8	28.5	 	LINECTONE	1 (15)			ļ		CDT C :		
-18.3 30.0 -1 -1 BORING TERMINATED AT 30 FEET ON 12/9/2004 -18.3 12 23				LIMESTONE, gray, slightly clayey, weather	red (LS)	78	9			SPI Sampler		
12/9/2004	-18.3	30.0		DODING TEDVINATED AT 70 FEET OF					-18.3			23
	,	=		DURING TERMINATED AT 30 FEET ON 12/9/2004								ŀ
				, , -								
	NG FORM 18											

			DIVI	SION	INSTALLATIO	NI NI		<u>H</u>	<u>ole N</u>	o. CP05-	-STA5N-C	CB-001	<u>5</u>
	DRILLI	NG LOG	DIVI	210N	INSTALLATIO	N					OF 1	1 Sheet	_
	1. PROJECT				10. SIZE A	ND TYPE	OF BIT	S	ee rer	narks		SHEE	1
		A 5/6 EXP	ANSION	DESIGN	11. COORD					DISTURBED	; UNDISTUR	RBED	1
	2. LOCATION CO			757047 05(4)	1		,		:	NAD83	: NG\	/D29	
1	FLORIDA 3. DRILLING AGE		04(E),Y=	=757813.95(N)	12. MANUF		DESIGNA	TION OF	DRILL				1
		.NCT EARTH SCIE	NCFS		Mobile 13. TOTAL				: DISTUR	חדה	: UNDISTURBE	<u> </u>	-
1	4. BORING DESIG		ITOLO		IS. IUIAL	SAMPLES			: : : אטונוט	9))	1
		5N-CB-00	15		14. TOTAL	NUMBER	CORE BOX	ES		0	·············	·	1
	5. NAME OF DR	ILLER			15. ELEVAT	ION GROU	IND WATER	 R	6	.5 Ft.	·····		1
	6. DIRECTION OF	HOLE					,	: START	ED	; C	OMPLETED		1
	▼ VERTICAL		ICLINED	DEG. FROM VERT.	16. DATE I	SURING		:	12/9/		12/9/2	2004	_
	7. THICKNESS O			N/A Ft.	17. ELEVAT	ION TOP	OF BORIN	G		+12.5	Ft.		_
	B. DEPTH DRILLE			19.5 Ft.	18. TOTAL							N/A %	6
	9. TOTAL DEPTH			30.0 Ft.	19. SIGNAT	URE AND				الماساما			
	9. IOIAL DEFIN	I I		CLASSIFICATION OF MATERIALS	1				giey, (Geologist			-
	ELEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE	1
			9			1	SAI 80	ÜĎ			BLC 0.5	۷ ۸	0.0
- 1	+12.5	0.0		SAND, tan gray, clayey, with limestone, shell (fill) (-200=21%, w=24%) (SC)	with	75	1			SPT Sampler	21		E
- 1	110 6	2.0		Coarse to medium, tan yellow, with roc	k				. 40 5		149	23	Ė
	+10.5	- 20 ∃		SAND WITH CLAY, dark brown, silty (SP		67	2		+10.5	SPT Sampler	6		-E _{2.5}
		- 크		Brown to yellow, clayey, trace rock	,						5	13	E
I	+8.5	4.0							+8.5		- <u>8</u>		.Ė
				LIMESTONE, tan to yellow, clayey, weath	ered (LS)	67	3			SPT Sampler	10		5.0
-	7	7 =							+6.5		7	16	E
- 1	=					67	4		10.0	SPT Sampler	- 5		Ė
				Sandy (w=15%, LL=19%, PI=2%)							7 13	20	7.5
						67	5		+4.5	SPT Sampler	22		Æ
Į				Yellow to light gray		"	J			or i oumpler	14	30	Ė
4									+2.5		- <u>16</u> 28	30	10.0
													F
													E
ı													E _{12.5}
i													F
- 1				Brown to white		100	6			SPT Sampler	9		E
				White to light gray, calcareous					-2.5	•	5	9	E 15.0
													E
						1					į		E
- 1													17.5
		4,6,5									İ		E
ł	-6.0	18.5		Gray to tan, and shell CLAY, bluish green, trace shell, medium	stiff	100	7			SPT Sampler			E
_		3/	///	(w=67%, LL=121%, PI=82%) (CL)	3				-7.5		3	5	20.0
000									-7.5		2		E 20.0
=					•						ľ		Ē
ē			///										F
1836.GD			///			.							22.5
뜅	-11.0	23.5	//	LIMESTONE, dark gray, clayey, weathered		67	8			SPT Sampler	5		E
릹			++++	calcareous, slightly clayey (LS)	''	67	"			ari adinplei	12	26	Ė
Se6.0			++++	•	ŀ				-12.5		14		<u>- 25.0</u> -
ST		-==-	+++										Ē
2 🗟		_===			İ								E
30013213 1/3/03 SFWMD ST5&6.GPJ		1					İ						<u> </u>
85	-16.0	28.5		CLAVEY CAND C						CDT C			E
-1				CLAYEY SAND, fine, gray, silty, trace re (-200=17.1%, w=21%) (SC)	ock	100	9			SPT Sampler	4		E
آمار	-17.5	30.0		BORING TERMINATED AT 30 FEET ON					-17.5		9	14	<u>=</u> 30.0
CORP		=		12/9/2004							ŀ		F
38													E
URS A													ſ
	NG FORM 18	36 6/296/3	045015 6	FWMD\BORING LOGS\revisions 2_3_05\b-15.d		- 1	1						J

								Н	ole No	. CP05-	-STA5N-C	CB-0016	<u>2</u>
	DRILLI	NG LOG	DIVI	ISION	INSTALLATIO	ON .					SHEET OF 1	1 Sheet	
ı	1. PROJECT				10. SIZE A	ND TYPE	OF BIT	S	ee rem	arks			1
I	SFWMD ST 2. LOCATION CO		XPANSION	DESIGN	11. COORD	INATE SY	STEM\DAT	UM	: D	ISTURBED	UNDISTU		1
4	FLORIDA	X=68493	2.83(E),Y:	=757817.45(N)	12. MANUF	ACTURER'	S DESIGN	ATION OF	DRILL	NAD83	NG	VD29	1
	3. DRILLING AGE WILLIAMS		UENCES		Mobile 13. TOTAL				: DISTURBE	· · · · · · · · · · · · · · · · · · ·	UNDISTURBE	· D	1
	4. BORING DESIG	SNATION			13. IUIAL	SAMPLES			DISTURBE	.v 9	-	υ Ο	
-	CP05-STA		0016		14. TOTAL	NUMBER	CORE BO)	ŒS		0]
	JOHN				15. ELEVAT	ION GROU	IND WATE	R : Start) F 1 .	OMPLETED		1
	6. DIRECTION OF VERTICAL		INCLINED	DEG. FROM VERT.	16. DATE E	BORING			1/23/2		11/23/	2004	
ŀ	7. THICKNESS O			N/A Ft.	17. ELEVAT	ION TOP	OF BORIN	G		+11.9	Ft.		
- 1	8. DEPTH DRILLE			2.0 Ft.	18. TOTAL							N/A %	
- 1	9. TOTAL DEPTH			30.0 Ft.	19. SIGNAT	URE AND			ж gley, Ge	ologist			l
I	ELEVATION	DEPTH	è	CLASSIFICATION OF MATERIALS		%		RQD)	*	7-1-2	ш	1
ı	ELETATION	567 111	LEGEND	(Description)		RÉC	BOX OR SAMPLE	OR UD		REMARKS	BLOWS/ 0.5 FT-	N- VALUE	0.0
ı	+11.9	0.0		LIMESTONE, brown (2-inch fill)		8	1			SPT Sampler	9		E"
ı	+9.9	2.0							+9.9		<u>5</u>	7	Ē
ŀ	73.3	2.0	///	SAND, fine, brown to dark brown, trace	,	100	2			SPT Sampler	- 2		2.5
	7	b =		organic (-200=0.7%, w=19%) (SP)					+7.9			8	Ē
				D		100	3	_	17.3	SPT Sampler			5.0
			121	Brown, clayey, with limestone fragments (-200=13.4%, w=16%) (SC)				!	+5.9		2	4	F-3.0
ı				Gray (-200=14%, w=16%) (SC)		67	4			SPT Sampler	- <u>2</u>		Ē
Í									+3.9		8 	15	7.5
						67	5			SPT Sampler	- 3		Ē
1											5	10	E.,,
- 1					Ì			-	+1.9		6		= 10.0 =
ľ													E
													E12.5
		=			(0.5)		_						Ę
				Silty, trace shell (-200=27.3%, w=19%)	(50)	100	6		i	SPT Sampler	4	8	Ē.,,
ı									3.1		4		= 15.0 =
i						İ		,					Ę
ł				·		İ							17.5
ļ	-6.6	18.5			(21)		_						Ę
- 1				CLAY, green, trace shell, medium stiff ((CL)	67	7			SPT Sampler	53	5	Ē
1/20/05					Ì				-8.1		2		E_20.0
													Ē
36.60													E_22.5
ACE_1836.GDT	~11.6	23.5											E
_1				SAND, fine, greenish gray, with clay, tro shell (SP)	ice	67	8	ı		SPT Sampler	11	0.7	Ė
ST5&6.GP.					ŀ				-13.1		13		<u>=</u> 25.0
S													Ē
5215 SF₩		_=											27.5
38615215 11/3/03 SFWMD													Ē
"= 1	İ	-		Trace limestone fragments		89	9			SPT Sampler	8	00	Ē
1 <u>%</u> ≨	-18.1	30.0	2 (42 (32 (4)	BORING TERMINATED AT 30 FEET ON					-18.1		10	20	E_30.0 E
JOB NUN CORP LOGS			:	11/23/2004		ļ							Ē
S 5													F
ARMY ARMY	NG FORM 18	36 6/296		SELVMD\ RORING DGS\ navisions 2 3 05\ h-16 du	2 (22)2	205 25		·0.T					1

				,			Н	<u>ole No</u>	<u>. CP05-</u>		CB-001	7
DRILLI	ING LOG	DIVI	ISION	INSTALLATIO	אכ					SHEET	1	7
1. PROJECT										OF 1	SHEET	4
	A 5/6 EXPA	истои	DESIGN	10. SIZE A				ee remo		III IN INTERIOR		4
2. LOCATION CO		1131011	DESION	11. COORD	INAIL SY	IEM\DAII	JM	: 0	STURBED	UNDISTUR		ł
FLORIDA	X=685931.6	2(E),Y:	=757814.94(N)	12. MANUF	ACTURER'	DESIGNA	TION OF	DRILL	NAD83	· NG	√D29	1
3. DRILLING AGE				Mobile								
	EARTH SCIEN	CES		13. TOTAL	SAMPLES			DISTURBE		UNDISTURBE		1
4. BORING DESIG	GNATION ASN-CB-001	7						:	9	<u>: (</u>)	1
5. NAME OF DR		·		14. TOTAL	NUMBER	CORE BOX	ES		0		····	
JOHN				15. ELEVAT	ION GROL	ND WATE			l Ft.			
6. DIRECTION OF	HOLE			16. DATE I	BORING		START			OMPLETED	0004	1
∨ERTICAL	. INC	LINED	DEG. FROM VERT.					1/20/2	~~~~~~~~~	11/20/	2004	-
7. THICKNESS O	F OVERBURDEN		N/A Ft.	17. ELEVAT					+11.9	r î.		1
8. DEPTH DRILLE	ED INTO ROCK		12.5 Ft.	18. TOTAL							N/A %	4
9. TOTAL DEPTH			30.0 Ft.	19. SIGNAT	URE AND				الماسمام			1
3. TOTAL BLITT	I		CLASSIFICATION OF MATERIALS	l		·		głey, Ge	ologisi			┨
ELEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE	
		<u> </u>	· · · · ·		REC	88	ÜĎ			9EG 0.5	~ *	0.
+11.9	0.0		SAND, tan to gray, silty, with rock (fill)	(SP)	25	t			SPT Sampler	10		E
										5	7	E
+9.9	2.0		SILT, black to dark brown, sandy, soft		100	2		+9.9	SPT Sampler	2		· 🖡 2
+8.9 \	7 3.0		(w=18% 11=24% Pl=9%) (MI)		100	2			ar i aditibiei	$\frac{1}{2}$	7	F,
- -	¥ - ∃ /	//	CLAY, dark gray to gray, silty, soft					+7.9			3	Ė
			(w=12%, LL=20%, Pl=9%) (CL)		100	3			SPT Sampler			Ė.
			Tan to brown, sandy, trace rock		Ì						8	<u> </u> -5
+5.9 +5.4	6.5		<u></u>	, (cn)	100			+5.9	CDT C I	8		Ē
±3.4	- 6.5		SAND, medium, dark brown, trace limes LIMESTONE, white to light gray, clayey,	stone (SP)	100	4			SPT Sampler	-4-		E
	▎ 불ᆣ	┌┸┰┸	weathered (LS)		1			+3.9		10	12	E-7
					100	5	_		SPT Sampler	<u>26</u> 10		E
1			Light gray, trace shell	į				+2.9		50	>50	Ė
1		1	Light gray, hace shell								750	E10
												Ē
												Ē
					ŀ		ļ					F 12
-1.1	13.0		CLAY, tan, silty, trace limestone, stiff (6	21.\								E
-2.1	14.0	//	·		100	6			SPT Sampler			E
	▎ ቜ┯	l_ l	LIMESTONE, tan, clayey, trace shell (LS)					-3.1	_	10	11	Ė,
		┖┰┖┰		İ								E
												Ē
					1							Ē.
					i							-17
-6.6	18.5		OLAY Elizab	-1:44	100	-			CDT CI			F
			CLAY, bluish green, calcareous, medium (w=27%, LL=34%, P!=13%) (CL)	SIIII	100	7			SPT Sampler	$\frac{1}{2}$	_	E
	l - - - - - - - - - -		(2714, 2 113, 11 7213, (22,	}				-B.1		3	5	<u>- 20</u>
	/	//)				}						E
												Ė
	= /,	//										<u>-</u> 2
-11.6	23.5	//										E
		TT	SILT, dark green to gray, clayey, trace	shell,	89	8		:	SPT Sampler	6		E
			stiff (ML)					~13.1	•	- 6	12	F 2
			Gray, calcareous	ļ								E
				ŀ		İ	[ŀ		F
												F.
					ľ		1					<u>-</u> 2
-16.6	28.5	111	INFCTONE ' ' '									F
			LIMESTONE, gray, sandy, with shell, weathered (LS)	İ	89	9			SPT Sampler	<u>6</u> 12		Ē
	30.0						_	-18.1		12	24	_3
	_ = _ '		BORING TERMINATED AT 30 FEET ON 11/20/2004	- 1	1	1	1					E
			,,		1							Ē
												r
NO FORM	7.0											
ING FORM 18	46 64 000 00	CIENIE (SEVMIN BORING OGS/revisions 2 3 05/h-17 de	- 2/22/2	00E D.EE	.17 AM C						

DRILLING LOG
11. PROJECT SFWMD STA 5/6 EXPANSION DESIGN 2. LICATION COORDINATES FLORIDA X=686813.31(E),Y=757819.16(N) 12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B53 13. TOTAL SAMPLES DISTURBED UNDISTURBED UNDISTURBED NADB3 NGVD29 14. TOTAL NUMBER CORE BOXES O 15. ELEVATION OF DRILLE DEG. FROM VERT. 7. THICKNESS OF OVERBURDEN B. DEPTH DRILLED INTO ROCK 12. OF 1. B. DEPTH DRILLED INTO ROCK 12. OF 1. SIGNATURE AND TYPE OF BIT See remarks 11. COORDINATE SYSTEM\DATUM DISTURBED UNDISTURBED UNDISTURBED UNDISTURBED 13. TOTAL SAMPLES DISTURBED UNDISTURBED UNDISTURBED 14. TOTAL NUMBER CORE BOXES O 15. ELEVATION GROUND WATER 16. DATE BORING 17. ELEVATION OF DEBRING 11/23/2004 11/23/2006
SFWMD STA 5/6 EXPANSION DESIGN 11. COORDINATE SYSTEM OATUM DISTURBED UNDISTURBED
12. MANUFACTURER'S DESIGNATION OF DRILL
S. DRILLING AGENCY WILLIAMS EARTH SCIENCES
WILLIAMS EARTH SCIENCES 4. BORING DESIGNATION CP05-STA5N-CB-0018 5. NAME OF DRILLER JOHN 6. DIRECTION OF HOLE VERTICAL INCLINED DEG. FROM VERT. 7. THICKNESS OF OVERBURDEN N/A Ft. 8. DEPTH DRILLED INTO ROCK 12.0 Ft. 9. TOTAL DEPTH OF HOLE SOLUTION OF HOLE CLASSIFICATION OF MATERIALS (Description) CDESCRIPTION CLASSIFICATION OF MATERIALS (Description) SAND, fine, tan b light gray, silty, with limestone fragments (roadway fill) (SP) +13.4 0.0 SAND, fine, tan b light gray, silty, with limestone fragments (roadway fill) (SP) +14.9 4.0 4.0 CLAY, gray to light brown, silty, organics PEAT, dark brown, silty, organics, soft(PT) 4.9 CLAY, gray to light brown, trace weathered limestone, silff (CL) 13. TOTAL SAMPLES DISTURBED 14. TOTAL NUMBER CORE BOXES 0 14. TOTAL NUMBER CORE BOXES 0 15. ELEVATION GROUND WATER 5. 9 Ft. 16. DATE BORING STARTED 11/23/2004 11/23/2
4. BORRING DESIGNATION CPOS—STA5N—CB—0018 14. TOTAL NUMBER CORE BOXES O
14. TOTAL NUMBER CORE BOXES 0
15. ELEVATION GROUND WATER 6.9 Ft.
S. DIRECTION OF HOLE
Note Note
7. THICKNESS OF OVERBURDEN N/A Ft. 8. DEPTH DRILLED INTO ROCK 9. TOTAL DEPTH OF HOLE SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) 17. ELEVATION TOP OF BORING 18. TOTAL CORE RECOVERY FOR BORING 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AND T
7. THICKNESS OF OVERBURDEN N/A Ft. 8. DEPTH DRILLED INTO ROCK 9. TOTAL DEPTH OF HOLE CLASSIFICATION OF MATERIALS (Description) CLASSIFICATION OF MATERIALS (Description) FILEVATION DEPTH SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION CLASSIFICATION OF MATERIALS (Description) SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION DEPTH SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fill) (SP) FILEVATION SAND, fine, tan to light gray, silty, with limestone fragments (roadway fi
19. SIGNATURE AND TITLE OF INSPECTOR 19. SIGNATURE AN
ELEVATION DEPTH CLASSIFICATION OF MATERIALS (Description) **REC SSS OR UD **REC SSS OR UD **REC SSS OR UD **REC SSS OR UD **REMARKS SSS SEC SSS OR UD **REMARKS SSS SEC SSS OR UD **REMARKS SSS SEC SSS OR UD **REMARKS SSS SEC SSS OR UD **REMARKS SSS SEC SSS OR UD **REMARKS SSS SEC SSS OR UD **SPT Sampler 12 **REMARKS SSS SEC SSS OR UD **REMARKS SSS SEC SSS OR UD **REMARKS SSS SEC SSS OR UD **REMARKS SSS SEC SSS OR UD **REMARKS SSS SSS OR UD **REMARKS SSS SSS SEC SSS OR UD **REMARKS SSS SSS SEC SSS OR UD **REMARKS SSS SSS SSS OR UD **REMARKS SSS SSS SSS SSS OR UD **REMARKS SSS SSS SSS OR UD **REMARKS SSS SSS SSS SSS OR UD **REMARKS SSS SSS SSS OR UD **REMARKS SSS SSS SSS SSS OR UD **REMARKS SSS SSS SSS SSS SSS OR UD **REMARKS SSS SSS SSS SSS SSS SSS SSS SSS SSS
Clayer Sand Sand Sand Sand Sand Sand Sand Sand
+13.4
+13.4
Ilimestone fragments (roadway fill) (SP)
1.4 1.4 6 1.4
19.4 4.0 19.4 1
19.4 4.0
+8.7
+8.0 5.5 CLAYEY SAND, gray, trace limestone (SC) +6.9 6.5 PEAT, dark brown, silty, organics, soft(PT) CLAY, gray to light brown, trace weathered limestone, stiff (CL) +4.9 8.5 PT Sampler 1 1 3
PEAT, dark brown, sifty, organics, soft(PT) +6.9 CLAY, gray to light brown, trace weathered limestone, stiff (CL) +4.9 8.5 HUTSTONS are already the LU (LS) 8 5 +7.4 SPT Sampler 4 7 +5.4 7 11
16.9 V 6.5 CLAY, gray to light brown, trace weathered limestone, stiff (CL) 14.9 8.5 SPT Sampler 4 3 7 4 7 7 11
limestone, stiff (CL)
+4.9 8.5 +5.4 7 +4.8 SPT Sampler 11
THUSTONS
-0.1 13.5 CLAYEY SAND, medium to fine, light gray, 67 6 SPT Sampler 1
calcareous, and shell (-200=28.7%, w=27%) (SC)
Fine, bluish green to gray, silty 89 7 SPT Sampler 1
-6.6 4 6
-9.6 23.0
-9.6 23.0 LIMESTONE, gray, sandy, with shell,
weathered (LS) 83 8 SPT Sampler 6
-11.6 -12 -12 -12
67 9 SPT Sampler 10
BORING TERMINATED AT 30 FEET ON
_= 11/23/2004
NG FORM 1836 G:\296\38615215 SFWMD\BURING LUGS\revisions 2_3_05\b-18.dwg 3/25/2005 94148 AM EST

						_	Н	ole_N	o. CP05		CB-001
DRILLI	NG LOG	DIV	ISION	INSTALLATIO	ON					SHEET	1
1. PROJECT										OF 1	SHEE
SFWMD ST	A 5/6 FY	(PANSION	DESIGN	10. SIZE A				ee rer			
2. LOCATION CO	ORDINATES	NI ANDION	DESIGN	11. COORD	ANAIL ST	SIEM/DAI	UM	:	DISTURBED NAD83	: Undistui 'Ng	VD29
		4.99(E),Y	=758592.19(N)	12. MANUF	ACTURER'	S DESIGNA	ATION OF	DRILL	NADOS) - <u>NG</u>	VUZ9
3. DRILLING AGE				Mobile							
WILLIAMS E		IENCES		13. TOTAL	SAMPLES			DISTUR		UNDISTURBE	
4. BORING DESIG		Ω1Q						:	9	; ()
5. NAME OF DRI		013		14. TOTAL	NUMBER	CORE BOX	ŒS		0		
JOHN				15. ELEVAT	TION GROU	JND WATE			.1 Ft.		
6. DIRECTION OF	HOLE			16. DATE I	BORING		STARTI			COMPLETED	0004
		INCLINED	DEG. FROM VERT.	<u> </u>				1/22/	/2004	11/22/	2004
7. THICKNESS OF	F OVERBURDE	:N	N/A Ft.	17. ELEVAT					+11.6	†1 .	
8. DEPTH DRILLE	D INTO ROCK	·	3.5 Ft.	18. TOTAL							N/A >
9. TOTAL DEPTH			30.0 Ft.	19. SIGNAT	IURE AND				Geologist		
ST TOTAL BELLIN	0. 110.2		CLASSIFICATION OF MATERIALS	<u></u>				giey, (seologisi		
ELEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
		2			REC	8 <u>8</u>	Ŭΰ			BLO 0.5	₹
+12.7	0.0		SAND, tan, with limestone fragments, g	ravel	25	1			SPT Sampler	8	
			(roadway fill) (SP)							- 4	6
+10.7	2.0	,,,	CLAYEY SAND, tan to yellow, silty, with		58	2	ļ	+10.7	SPT Sampler	2	
7	b <u>J</u>	///	weathered limestone, trace shell		ا ٥٥				ari aumpier	$\frac{2}{2}$	5
+8.7	4.0	///	(-200=18.1%, w=23%) (SC)					+8.7		3	ן ס
	<u> </u>		LIMESTONE AND CLAYEY SAND, tan to		50	3		,	SPT Sampler	4	
	_		yellow, weathered (LS-SC)							3	6
+6.7	6.0						ļ 	+6.7		3	
	∄		LIMESTONE, tan, clayey, weathered, with shell (LS)		100	4			SPT Sampler	- 3	_
+4.7	8.0	<u>l</u>	Shell (ES)					147		4	7
T4.1	- 0.0		CLAY, tan, with weathered limestone, so	oft	13	5		+4.7	SPT Sampler	1	
	=	7	(LS-CL)						•	0	1
		ユ#/						+2.7			
	=	/									
	=										
			1								
-0.8	13.5	' - //	1								
-0.0			CLAY, white, with weathered limestone,	very	100	6			SPT Sampler	10	
	\equiv		stiff (CL-LS)	·				-2.3	•	14	21
	ョ			İ				2.0			
	$\vec{\exists}$									ĺ	
İ		/],,I								,	
	_							!			
-5.8	18.5		CANDY CLAY LIST			_			CDT O		
	=		SANDY CLAY, bluish gray, calcareous, abundant shell, medium stiff (SC)		89	7			SPT Sampler	-1	_
	=		and the state of t]				-7.3		3	6
ļ											
[///									
		///									
-10.8	23.5	///									
			SILT, bluish gray, clayey, calcareous, tro	ce	67	8			SPT Sampler	10	
	∄		sand, very stiff (ML)				1	-12.3		9 8	17
İ	三			ļ							
	\exists						ļ				
	_=										
	_=			1	ļ						
			LIMECTONE			_	İ		COT C		
-15.8	28.5				83	9	l		SPT Sampler		
			LIMESTONE, gray to light gray, slightly clavev, weathered (LS)	J	I						
-15.8 -17.3	30.0		clayey, weathered (LS)					-17.3		7	17
			clayey, weathered (LS) BORING TERMINATED AT 30 FEET ON					-17.3		7	17
			clayey, weathered (LS)					-17.3		7	17
			clayey, weathered (LS) BORING TERMINATED AT 30 FEET ON					-17.3		7	17

							Н	ole No	. CP05-	STA5N-C	B-0020
DRILL	ING LOG	DIVI	NOIS	INSTALLATIO	N					SHEET OF 1	1 Sheet
1. PROJECT		.1		10. SIZE A	ND TYPE	OF BIT	Se	e remo	rks	101 1	J.ILL.
SFWMD ST	ΓA 5/6 EX	PANSION	DESIGN	11. COORDI					STURBED	: UNDISTUR	BED
2. LOCATION CO		07/F\V	-750508 77(N)					<u> </u>	NAD83	: NG\	/D29
3. DRILLING AGE		7.03(E),1-	=759508.37(N)	12. MANUF/ Mobile		DESIGNA	TION OF	DRILL			
	EARTH SC	IENCES		13. TOTAL				DISTURBE	D	: UNDISTURBE	D
4. BORING DESI									9	: 0)
CPO5-STA	A5N-CB-0	020		14. TOTAL	NUMBER (CORE BOX	ES		0		
JOHN	RILLER			15. ELEVAT	ION GROU	ND WATE			Ft.		
6. DIRECTION OF	F HOLE			16. DATE B	ORING		STARTE			OMPLETED	2004
∨ERTICAL	. 🗆	INCLINED	DEG. FROM VERT.			or popul		1/22/2	+11.6 F	11/22/	2004
7. THICKNESS C	OF OVERBURDE	N	N/A Ft.	17. ELEVAT					+11.0 F	· 1.	N/A %
8. DEPTH DRILL	ED INTO ROCK	(5.0 Ft.	18. TOTAL 19. SIGNAT					.	•	N/A A
9. TOTAL DEPTH	OF HOLE		30.0 Ft.	TJ. SIGNAT	OKL AND			n gley, Ge	ologist		
ELEVATION.	DEBTU	٥	CLASSIFICATION OF MATERIALS	·	%		RQD			75	띧
ELEVATION	DEPTH	LEGEND	(Description)		REC	BOX OR SAMPLE	OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
+11.6	0.0		SAND, tan to yellow, clayey, with rock		29	<u></u> Δ σ	QU		SPT Sampler	12	
l			fragments, fill		-	•				4	7
								+9.6		- 3 -	
Ī	=		Black to dark brown, silty (-200=11.7% w=48%) (SP-SC)	6,	25	2			SPT Sampler	$\frac{1}{2}$	_
+7.6 √	↓ _{4.0} ≡		#-7076) (Si 30)			:		+7.6		1	3
77.0	¥ • • • • • • • • • • • • • • • • • • •		SANDY CLAY, dark brown to brown, tra	ce	88	3			SPT Sampler	2	
,	T =		rock, soft (CL) Tan, silty								3
+5.6	6.0 =		SILTY SAND, dark brown to black, trace	rock	75	4		+5.6	SPT Sampler	2 2	
	=		Brown, clayey (w=18%) (SM)	, 100K	'3	7			o. i odnipici	3	6
+3.6	8.0		Tan, and weathered limestone					+3.6	· · · · · · · · · · · · · · · · · · ·	- 3 2	
			CLAYEY SAND, tan to gray, calcareous,		83	5			SPT Sampler	WOH1	
•			abundant shell (SC)	į				116			2
Í								+1.6		2	
	=										
	1 =				Ì						
]			3							
-1.9	13.5		CLAY, white to light gray, slightly sandy	,	100	6			SPT Sampler	WOH	
	=		calcareous (w=24%, LL=29%, Pl=9%) (C	i)		-		-3.4		- WOH	
1	🗐			1				U.T		-	
	=										
					ł						
	,,_=	///			ł						
-6.9	18.5		LIMESTONE, tan, clayey, weathered (LS)		67	7	,		SPT Sampler	3	
1			(==)		1			-8.4	·	5	8
				ļ							
	=										Ĭ.
	=		·	1						i	
	,,_=										
-11.9	23.5	///	CLAYEY SAND, dark gray, calcareous (S	c)	83	8			SPT Sampler	3	
								-13.4		4	10
	=	///		ļ	1				· ·	•	····································
	=	///									
	=			ļ							
	=	///									
	_]	///			100	9			SPT Sampler	4	
-18.4	30.0							-18.4	•		9
1			BORING TERMINATED AT 30 FEET ON							4	
			11/22/2004								
	├ ──=										
									<u> </u>		
	836 GY	\296\386158	215 SFWMD\BORING LOGS\revisions 2_3_05\b-	-20.dwg 3/2	23/2005	10:00:49	AM EST				

							Н	ole N	lo. CP05-	-STA5N-	CB-002
DRILLI	NG LOG	DIV	ISION	INSTALLATIO)N					SHEET	1
1. PROJECT				10. SIZE AI	ND TYPE	AC DIT		ee ren		OF 1	SHEET
	A 5/6 EXP	ANSION	DESIGN	11. COORDI					DISTURBED	· UNDISTU	RRFD
2. LOCATION COC		77/5\ \	700 440 00(11)			•		:	NAD83		VD29
3. DRILLING AGEN		//(E),Y	=760446.29(N)	12. MANUFA		S DESIGNA	ATION OF	DRILL			
	EARTH SCIEI	NCES		Mobile 13. TOTAL				: DISTURI	RED.	: UNDISTURBE	'D
4. BORING DESIG	NATION			100.10112	OTTAIN ELD			:	9	. (
CPO5-STA:	5N-CB-002	21		14. TOTAL	NUMBER	CORE BOX	ŒS		0		
JOHN	LLEK			15. ELEVAT	ION GROU	IND WATE	R	8	.3 Ft.		
6. DIRECTION OF	HOLE			16. DATE B	ORING		STARTE			OMPLETED	
X VERTICAL	IN	CLINED	DEG. FROM VERT.					1/22/		11/22/	2004
7. THICKNESS OF	OVERBURDEN		N/A Ft.	17. ELEVATI					+12.8	· 1.	11./4
8. DEPTH DRILLE	D INTO ROCK	-	8.5 Ft.	18. TOTAL 19. SIGNATU							N/A %
9. TOTAL DEPTH	OF HOLE		30.0 Ft.	19. SIGNATO	UKE AND				Geologist		
FIGURON	DEBTH		CLASSIFICATION OF MATERIALS					9.0/,	, o o i o g i o i		
ELEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
+12.8	0.0 = V	मान्यार साम्बर्गार	CHTY CAMP Habi area to take to the	-1.	58		UD		CDT Cl		^
112.0	""	X1XII	SILTY SAND, light gray to tan, trace roo	CK C-SM)	28	1			SPT Sampler	8 6	8
+10.8	2.0		Gray to tan, clayey	1				+10.8		2	0
+10.6	2.2 ∃ [LIMESTONE, orange to brown, with sand	١, /	67	2			SPT Sampler	_ 2	
		$\{\{\}\}\}$	weathered (-200=2.4%, w=24%) (SP) SILTY SAND, dark brown to brown								7
$^{-}$	Z 🗐		la	9%)	8	3		+8.8	SPT Sampler	10	
+7.8	5.0		Tan to yellow, clayey, with weathered	SD SW				+8.0		50	>50
	=	+++	Vimestone (SI) LIMESTONE, tan, slightly clayey, weather		- 1						750
ľ	—	-1-1-1	i initiation, idin, siigiiny didysy, wediner	00 (13)	75	4			SPT Sampler	15	
-		111	Dark gray to brown, clayey					+4.8		7	27
i	===	++	White to light gray, calcareous	ľ	75	5		T4.0	SPT Sampler	4	
	-	- 			İ					3	8
	-====	<u></u>		-				+2.8		6	
		111									
l	1										
-0.7	13.5				1						
	Ⅎ	//,	CLAY, white, trace weathered limestone, soft (w=32%, LL=27%, Pl=10%) (CL)	very	100	6			SPT Sampler		_
	-	//,	1 doi: (iii dzin, 22-2/m, 11-10m) (dz)	_				-2.2			2
		//,									
		//,									
İ		//,		į	Ì						
-5.7	18.5										
			SAND, gray to bluish gray, calcareous ((SP)	78	7			SPT Sampler	-2	
	-			-				-7.2		5	8
							ŀ				
				+							
							ļ				
			Bluish gray, clayey, and shell, with lime abundant shell	stone,	100	8			SPT Sampler	4	
	- 二 ※		GDANGGIII SHEN	-				-12.2		4	7
							1				
ľ	■※									1	
15.7	28.5	11 11 11 11	CHTY CAND Lining and all the /c	SM)	100	9	j		SPT Sampler	3	
-15.7	28.5		SILTY SAND, bluish gray, clayey, silty, (S		,						
-15.7 -17.2	30.0		calcareous					-17.2		3 3	6
			BORING TERMINATED AT 30 FEET ON					-17.2		3 3	6
			calcareous					-17.2		3	
			BORING TERMINATED AT 30 FEET ON				-	-17.2		3	6

							Н	ole N	o. CP05-		B-002
DRILLI	NG LOG	DIVI	SION	INSTALLATIO	ON					SHEET	1
1. PROJECT	<u>-</u>		···	10. SIZE A	ND TVDE	AE DIT		00 FOR		OF 1	SHEET
	A 5/6 EXPA	NSION	DESIGN	11. COORD				ee rem	DISTURBED	: UNDISTUR	RFD
2. LOCATION CO	ORDINATES			1		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		:	NAD83	:	/D29
		7(E),Y:	=761350.88(N)	12. MANUF		S DESIGNA	TION OF	DRILL			
3. DRILLING AGE	.NCY EARTH SCIEN	CES		Mobile 13. TOTAL				: DISTURE)FD	INDICTUOR	
4. BORING DESIG		OLS		13. IUIAL	SAMPLES			: DIZTURE	9 9	: UNDISTURBE : (
CP05-STA	5N-CB-0022	2		14. TOTAL	NUMBER	CORE BOX	FS	<u> </u>	0		<u>'</u>
5. NAME OF DRI	LLER			15. ELEVAT				6	.6 Ft.		
JOHN 6. DIRECTION OF	HOLE					AND WASE	: STARTI			OMPLETED	
VERTICAL	•	MICD	DEG. FROM VERT.	16. DATE E	BORING			1/22/		11/22/	2004
				17. ELEVAT	TON TOP	OF BORIN	G		+11.6 F	†.	~
7. THICKNESS 0			N/A Ft.	18. TOTAL	CORE RE	COVERY FO	OR BORIN	G			N/A %
8. DEPTH DRILLE			7.5 Ft.	19. SIGNAT	URE AND	TITLE OF	INSPECTO)R			····
9. TOTAL DEPTH	OF HOLE		30.0 Ft.				J. Lan	gley, G	eologist		
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- /ALUE
		<u> </u>				SAS	UD			BLO 0.5	××
+11.6	0.0		SAND, dark brown to tan, silty, with ro	ck	75	1			SPT Sampler	2	
	国際							+9.6		3	6
			Dark brown (-200=4.4%, w=21%) (SP)		75	2		+9.D	SPT Sampler		··············
	│ <u>-</u> ■※		Gray, clayey						•	- 2	4
+7.6	4.0		, , , , , , , , , , , , , , , , , , , ,	>			. <u> </u>	+7.6		- 7	
			LIMESTONE AND SAND, tan to yellow, (L clayey, weathered	S-SP)	67	3			SPT Sampler	3	_
+5.6	6.0	十十	alayay, waamaraa					+5.6		3	6
15.0			LIMESTONE, light gray, sandy, clayey, w	ith	67	4		TJ.0	SPT Sampler	- 2	~
			shell, calcareous (LS)							3	5
	_===		1471)		- 50			+3.6		2	
		$-\Box$	With sand matrix		50	5			SPT Sampler	$\frac{2}{3}$	•
								+1.6		3	6
								11.0		2	
		井									
-1.9	13.5	7	CLAY, white, with weathered limestone	·-··	100	6			SPT Sampler		
			(w=23%, LL=23%, PI=7%) (CL-LS)			ĭ		7.1	or a sampler	6	12
								-3.4		6	- 12
	<u>-</u>					-					
	 										
-6.9	18.5		CLAVEY CAND		6.7	,			CDT C 1		
			CLAYEY SAND, medium, light gray, with abundant shell, trace weathered limesto	ne (SC)	67	7			SPT Sampler	4	
			,	()				-8.4		4	8
					1						
										ļ	
	₹/					-					
-11.9	23.5				1	ł					
			SAND, fine, gray, slightly clayey, with s calcareous (SP)	hell,	83	8	ĺ		SPT Sampler	<u>8</u>	
			cologicons (2)	ļ				-13.4		15	28
						ļ				ļ	
										İ	
	=				ľ	.					
			Blue gray	-	100	9			SPT Sampler	3	
-18.4	30.0							-18.4		3	9
			BORING TERMINATED AT 30 FEET ON							* *	
			11/22/2004	Í						1	
											
NG FORM 18	36 6/296/38	615215	SFWMD\BORING LOGS\revisions 2_3_05\b-22.	dwo 3/23/	2005 10	04:38 AM	FCT		· · · · · · · · · · · · · · · · · · ·		

							Н	ole N	o. CP05-	-STA5N-(CB-002	<u>.3</u>
DRILL	ING LOG	DIVI	ISION	INSTALLATI	ON					SHEET	1	_
1. PROJECT				10 0175						OF 1	SHEET	4
SFWMD ST	TA 5/6 FX	MUSIUM	DESIGN	10. SIZE A				ee rer		LINDICTU	DOED	4
2. LOCATION CO		ANSION	DESIGN	11. COORD	MNAIE ST	SIEM\DAII	UM:		DISTURBED	UNDISTU		
		3.86(E),Y:	=762258.96(N)	12. MANUF	ACTURER'	S DESIGNA	TION OF	DRILL	NAD83	- 110	VD29	┨
3. DRILLING AGE				Mobile	B53							
WILLIAMS		IENCES		13. TOTAL	SAMPLES			DISTUR		UNDISTURBE		1
4. BORING DESI	gnation 45N-CB-0	027		·				<u>:</u>	9	: ()	1
5. NAME OF DR		023		14. TOTAL	NUMBER	CORE BOX	ŒS		0			
JOHN				15. ELEVA	TION GROU	IND WATE			′.8 F 1 .			
6. DIRECTION OF	F HOLE			16. DATE	BORING		START			OMPLETED		
	- 🗆	INCLINED	DEG. FROM VERT.					1/20,	/2004	11/20/	2004	4
7. THICKNESS O	OF OVERBURDE	.N	N/A Ft.	17. ELEVA				~	+11.8	tt.		4
8. DEPTH DRILLI	ED INTO ROCK	<u> </u>	N/A Ft.	18. TOTAL					·		N/A %	6
9. TOTAL DEPTH	······	`	30.0 Ft.	19. SIGNAT	TURE AND				Coologiat			
3. IOIAL DEFIN	T OF HOLE		CLASSIFICATION OF MATERIALS	<u> </u>			1	giey, i	Geologist			-
ELEVATION	DEPTH	LEGEND	(Description)		% 	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE	1
			, , ,		REC	S &	άŭ			8LO 0.5	× ₹	0
+11.8	0.0	42 42 4	PEAT, dark brown, silty, soft (PT)		42	1			SPT Sampler	3		ŧ,
		1 11 11								- 6	8	F
+9.5	2.3	<u> </u>			L		ļ	+9.8	CDT C :	2		٠Ę٠
		///	CLAYEY SAND, dark brown to brown to	tan	83	2			SPT Sampler	- 2 3	_	2
7	# 1		1					+7.8		3	6	F
<u> </u>	* =		Brown to dark brown, with silt (-200=2	21.8%.	75	3		+7.8	SPT Sampler			·E
	=		w=24%) Tan to light gray (SC)								13	_5
	l _∃	///	Yellow to tan, with limestone fragments					+5.8		- 6	13	Æ
+5.3	6.5		Brown to tan	(00)	100	4			SPT Sampler	- 5		E
	1 =		Yellow to brown (-200=26.1%, w=17%) CLAY, white, silty, hard (CL)	(20)						10	40	E 7
+3.8	8.0 =	terketet.	CLAYEY SAND, gray to dark gray, with	rock	83	5		+3.8	SPT Sampler	34		- <u>F</u>
+2.8	9.0	<i>11.[1]</i> []] (w=24%, LL=24%, PI=6%) (SC)		03	J			or i odinpier	<u>6</u> 6	24	E
		///	CLAY, gray to tan, silty, hard					+1.8		<u>18</u>	24	Ė 10
1		///	1						· · · · · · · · · · · · · · · · · · ·			F
		///										E
	▎ ₫		1									Ē.,
1												E12
			1		100				CDT C			E
1			Light gray, with rock fragments, very s	oft	100	6			SPT Sampler			E
	│ 		(w=36%, LL=25%, Pl=4%) (CL)					-3.2		1	<u>'</u>	-15
	_=											Ė
	∄						ľ					E
							:					E 17
-6.7	18.5											Ė
		///	CLAYEY SAND, fine, bluish green,		89	7			SPT Sampler	3		ŧ
22		///	calcareous, with limestone fragments ar	nd				-8.2		-4-	11	E 20
1/20/05	=	///	shell (SC)				,					F
1	-			l								Ē
, GDT	=									ļ		F.
1836.601				İ								E_22
-11.7	23.5		0.47 11			_			CDT C			F
	=		CLAY, blue gray, silty, calcareous with s and rock fragments, medium stiff (CL)	ineli	100	8			SPT Sampler	-4	_	F
ST5&6.GP.			rook tragmonia, modium anti (ct)					-13.2		3	7	. <u>E</u> 25
STS	<u>€</u>				1							E
<u> </u>												E
, to	📑											E 27
-16.7	28.5											E
5 <u>-10./</u>	20.3		SAND, medium, bluish gray, silty, trace s	shell (SP)	100	9			SPT Sampler			F
	30.0		,, 5. 2/ 2///, 1/400 ((5.7)		-		_10 ^		6	12	F ,.
	20,0		BORING TERMINATED AT 30 FEET ON					-18.2	· · · · · · · · · · · · · · · · · · ·	6		<u>-</u> 30
			l	t	- 1	- 1						F
TOGS TOGS	=		11/20/2004	ł		1	1			,		
CORPLICOS			11/20/2004									E
TOGS			11/20/2004									F

							Н	ole No.	CP05-	-STA5N-(CB-0024
DRILL	ING LOG	DIV	ISION	INSTALLATIO	NC					SHEET	1
1. PROJECT		i_		10 5175 4	HD TYPE	OF DIT			.d	OF 1	SHEET
SFWMD ST	A 5/6 E	XPANSION	DESIGN	10. SIZE A				ee rema	rks STURBED	: UNDISTU	DRED
2. LOCATION CO	ORDINATES			111. 0001.5	MAIL SI	DIEM (DAI	O m	:	NAD83	-	VD29
		9.61(E),Y	=757822.80(N)	12. MANUF		S DESIGNA	ATION OF	DRILL	11/1000		,,,,,,
3. DRILLING AGE WILLIAMS		HENCES		Mobile				DIGTURDE			
4. BORING DESI		HEINGES		13. TOTAL	SAMPLES			DISTURBED	9	UNDISTURBE	.D (
CP05-STA		0024		14. TOTAL	NIMBER	CORE ROY	/FS	·	0	· '	
5. NAME OF DR				15. ELEVAT				8.9			
DAVE & N 6. DIRECTION OF						MO HAIL	; START			OMPLETED	
VERTICAL		INCLINED	DEG. FROM VERT.	16. DATE E	BORING			11/23/20		11/23/	2004
		-		17. ELEVAT	ION TOP	OF BORIN	G	•	+12.9		
7. THICKNESS O			N/A Ft.	18. TOTAL	CORE RE	COVERY F	OR BORIN	IG		- · · · · · · · · · · · · · · · · · ·	N/A %
8. DEPTH DRILLE		К	N/A Ft.	19. SIGNAT	URE AND	TITLE OF	INSPECT	OR			
9. TOTAL DEPTH	OF HOLE		30.0 Ft.				,	Beau			
ELEVATION	DEPTH	9	CLASSIFICATION OF MATERIALS		%	유	RQD		REMARKS	IS/	, 😸 🖡
		LEGEND	(Description)		REC	BOX OR SAMPLE	OR UD		KEMAKNS	BLOWS/ 0.5 FT-	N- VALUE
+12.9	0.0		LIMESTONE AND SAND, gray to dark bro	wn,	75	1		S	PT Sampler	8	
	=		and organics (fill)						•	14	22
+10.9	2.0							+10.9		<u> </u>	
			SAND, brown to dark brown, trace silt, organics (SP)	and	58	2]	S	PT Sampler	2	_
7	$b \equiv$		- organica (ar)					100			5
-	<u>† </u>	1	With limestone fragments		63	3	 	+8.9 S	PT Sampler	57	
l	-							,	•	7	11
+6.9	6.0							+6.9		- 4	
1			CLAYEY SAND, medium, light brown. wit crushed limestone (-200=53.8%, w=189	h () (sc)	75	4		S	PT Sampler	<u>4</u> 15	
	=		crushed innesione (~200-33.8%, w-18/	·) (3C)						- 6	21
	=		(-200=53.8%, w=18%) (CL-SC)		75	5		+4.9 S	PT Sampler	12	
ı	_=		(-200=55.6%, W=16%) (CL-5C)					-		13	28.
	_≣							+2.9		<u>15</u>	20
					:					- · · · ·	-
i .							İ]			ŀ
											Į
											ŀ
			Light brown to green, with shell		78	6		s	PT Sampler	7	
								-2.1	•	- 6	10
1	=	///		ľ				2.1		4	
	-=	///									
	=			i	ļ						
~5.6	18.5		SAND, fine, greenish gray, trace clay, a		67	7		٠	PT Sampler		
			shell (SP)	ina	87	,			r i Sumpier	<u> </u>	
·	=		, ,	ŀ				_ 7.1		11	18
				İ	- 1						
	▋										1
											1
				l							
	_=		Gray, trace limestone fragments	ŀ	100	8		SI	PT Sampler	5	
					:			-12.1		12	26
	=				1					1	F
	===									-	
45.5										ł	
-15.6	28.5	///	CLAYEY SAND, fine, greenish, trace shell	(SC)	83	9		CI	PT Sampler		
_17.1	30.0		Table 5 and, and, grownian, nade shen	(50)	33	-	-		. campier	6	14
<u>–17.1</u>	30.U —	1.5.7.5.7.3	BORING TERMINATED AT 30 FEET ON					-17.1			14
	=		11/23/2004				ļ				F
	_: =										
	1				Ī	Ī					
						:19 AM F					

								H	ole No	. CP05-	-STA5N-C	CB-002	5
	DRILLI	NG LOG	DIV	SION	INSTALLATIO	ON					SHEET	1	7
-	. PROJECT									 	OF 1	SHEET	4
- 1"		A 5/6 EXPA	исіом	DESIGN	10. SIZE A				e rem	arks DISTURBED	UNDICTU		4
1_2	. LOCATION CO		1131011	DESIGN	11. COORD	INAIL ST	SIEM/DAII	UM	: 1	NAD83	UNDISTU	квер /D29	1
- 1			O(E),Y	=757811.01(N)	12. MANUF	ACTURER'	S DESIGNA	ATION OF	DRILL	NADOS	· NG	V D Z 9	1
3.	. DRILLING AGE		050		Mobile								
Ŀ	. BORING DESIG	ARTH SCIEN	CF2		13. TOTAL	SAMPLES			DISTURB		UNDISTURBE		1
*		5N-CB-002	5	%	44 70711			·F0	:	9	: ()	-
5.	. NAME OF DRI				14. TOTAL					0		•	-
	NHOL			· · · · · · · · · · · · · · · · · · ·	15. ELEVAT	ION GROU	IND WATE	- STARTE		7 Ft.	OMPLETED	 	4
6.	. DIRECTION OF				16. DATE E	BORING			ט. 1/23/2		11/23/	2004	1
L	⊠ VERTICAL	INC	LINED	DEG. FROM VERT.	17. ELEVAT	ION TOP	OF BORIN		.,,	+12.7 F			1
- 1-	. THICKNESS OF			N/A Ft.	18. TOTAL	CORE RE	COVERY FO	OR BORING				N/A %	<i>-</i>
8.	. DEPTH DRILLE	D INTO ROCK		12.5 Ft.	19. SIGNAT								1
9.	, TOTAL DEPTH	OF HOLE		30.0 Ft.						eologist			1
ŀ	ELEVATION	DEPTH	2	CLASSIFICATION OF MATERIALS		%	유권	RQD		BELLIBUA	.T-	. ఆ	
1			LEGEND	(Description)		REC	BOX OR SAMPLE	OR UD		REMARKS	BLOWS/ 0.5 FT-	N- VALUE	1
	+12.7	0.0		SAND, tan, silty, with rock fragments (S	SP)	33	1			SPT Sampler	11		0.0
		<u>-</u> ≣≫		(roadway fill)	•					•	9	13	E
<u> </u>	+10.7	2.0	<i>2</i> 1 '	CHARGEONE AND OLDER COMP.					+10.7				.ŧ
ŀ	ł			LIMESTONE AND CLAYEY SAND, dark brown, silty, organic (-200=12.7%, w=1	4%)	50	2			SPT Sampler	2	_	2.5
	4	7 = 1/2		Brown (SP-SC-LS)	•				+8.7		4	. 7	E
	-			Light brown to orange, clayey, with wed limestone (w=15%, LL=26%, Pl=6%)	ithered	63	3		10,7	SPT Sampler		·	Ė.,
				Tan to yellow, silty, trace shell								5	<u>-</u> 5.0
⊢	+6.7	6.0		LIMESTONE, tan, clayey, sandy, weathere	4 (10)	101	.4		+6.7	SPT Sampler	17		Æ
		_==		LIMESTONE, Idni, Cidyey, Sandy, Wedinere	a (LS)	1011				-Sr i Sampier	50	>50	E.,
													- 7.5 -
						88	5			SPT Sampler			Ē
•		===										8	E
ĺ		-							+2.7		7		10.0
											,		Ē
		===											E
		<u></u>											12.5
ı						400							ŧ
						100	6			SPT Sampler	- 8 - 3	F	E
1			 						-2.3		2		15.0
		<u> </u>											Ė
- 1	l	==-											E
1	ļ												17.5
Ĺ	-5.8	18.5		OLAVEY CAUS CO	(00)		_						E
		=1/		CLAYEY SAND, fine, bluish gray, slightly clayey, with shell	(SC)	89	7			SPT Sampler	-4-	_	Ē
/20/02					-				-7.3		5	8	20.0
1/20		3/			-	[E
او				•								-	E
1836.001] //									1		22.5
 	-10.8	23.5											E
4			$\mathbb{H} : \mathbb{H}$	LIMESTONE AND SAND, medium to fine,		100	8	Ì		SPT Sampler	<u> </u>		ŧ
ST5&6,GP.	İ		_	to light gray, slightly clayey, silty, weath (LS-SP)	ered,				-12.3		- 5	11	25.0
STS	}]	(LS SI)			-	ļ					F
38615215 11/3/03 SFWMD]		ŀ								E
521 SF]		1						1		27.5
3/03	-15.8	28.5	1		İ						Ī		Ē
ω <u>÷</u>		_=111	$\Pi\Pi$	SILTY SAND, fine, dark gray, slightly cla	yey,	100	9			SPT Sampler	4		ŧ
. · <u>.</u>	-17.3	30.0		odor (SM)					-17.3		- 7 10	17	E_30.0
Şβ		. =		BORING TERMINATED AT 30 FEET ON									E
JOB NUK		ョ		11/23/2004			ľ						E
													F
ARM _													j
ENG	FORM 18	36 (1,20(1,20)											

								Н	ole No.	CP05-	STA5N-C	CB-0026	
	DRILLI	NG LOG	DIV	ISION	INSTALLATIO	ON					SHEET	1	
	1. PROJECT				40 0175	TVDF	or DIT				OF 1	SHEET	
	SFWMD ST	A 5/6 E	XPANSION	DESIGN	10. SIZE A				ee remarks		: UNDISTUR	PRED	
	2. LOCATION CO	ORDINATES			111. 00011	MAIL 31	STEM (DAT	- m		NAD83	-	/D29	
1			7.96(E),Y	=757811.02(N)	12. MANUF		S DESIGN	ATION OF					
	 DRILLING AGE WILLIAMS 		CIENCES		Mobile 13. TOTAL				: DISTURBED		: UNDISTURBE		
	4. BORING DESIG	SNATION			13. IUIAL	JAMPLES			: 9		: UNDISTURBE		
	CP05-STA		0026		14. TOTAL	NUMBER	CORE BOX	(ES		0			
	5. NAME OF DRI JOHN	LLER			15. ELEVA	TION GROU	JND WATE	R	8 Ft.		·····		
	6. DIRECTION OF	HOLE			16. DATE	RORING		START			MPLETED		
	∨ERTICAL] INCLINED	DEG. FROM VERT.					1/23/2004		11/23/	2004	
	7. THICKNESS O	F OVERBURD)EN	N/A Ft.	17. ELEVAT					+12.5 F	<u>t.</u>		
	8. DEPTH DRILLE	D INTO ROC	K	N/A Ft.	18. TOTAL 19. SIGNAT							N/A %	
	9. TOTAL DEPTH	OF HOLE		30.0 Ft.	. 19. SIGNAT	UKE, AND	HILL UP	MOLECIA	Beau				
	ELEVATION	DEDTU		CLASSIFICATION OF MATERIALS	····		ЖН	RQD			:5.1	ш	
	CLEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	OR	1	REMARKS	BLOWS/ 0.5 FT-	VALUE	
	+12.5	0.0 =		SILT, light brown to gray, with limeston	•	33	± 50 1	UD	SPT	Sampler	11		_0.
	112.0	"		fragments (fill), very stiff (-200=30.7%	√, w=9%,	3	,		311	Sumplei	14	20	
	+10.5	2.0		LL=25%, PI=5%) (ML)					+10.5		<u> 6 </u>	_ F	
				SAND, fine, gray and brown, trace silt, organics	and	58	2		SPT	Sampler	5		_2.
	_	L =		organics					+8.5		4	. 8	
	7	V -		Light brown, clayey, trace limestone		75	3			Sampler	9	E	
	-	T =		fragments (-200=18.8%,w=14%) (SC)							65	11	_5.
1	+6.5	6.0 =		LINESTONE AND CAND C. F. L.		67			+6.5	6 1	6	F	
- 1		13.5	一	LIMESTONE AND SAND, fine, light brown, clayey, weathered (LS-SP)	1	6/	4		581	Sampler	8 28	. E	
				, ,					+4.5		32 15	60	_7.
		=				67	5			Sampler		 	
,											<u>16</u>	27	
- 1				d					+2.5		9	<u>-</u>	_10
		_ <u>=</u>	中	4					ļ			E	
								ı					
												F	_12
-	-1.0	13.5		SAND, fine, light brown, trace shell (SP	· · · · · · ·	44	6		CDT	Sampler		E	
		Ξ		JAND, Tille, agail brown, frace shell (ar	'	77	Ū			Jumpier .	6 6	11	4.5
Į		==	V/////						-2.5		5		_15
											i	E	
												Ē	47
ł		18.5										E	_17
ł	-6.0	18.5	///	CLAYEY SAND, fine, greenish, trace shel	,	89	7		SPT	Sampler		E	
				and limestone fragments (SC)	',		•		-7.5	·	2	6 E	20
1/20/05									-7.5		4	E	_20
- 1		=]						ŧ	
1836.CDT		_]						· F	
1836	i	_=				1						E	_22
ACE		=				100	8	i	CDT	Sampler .		E	
忌							·			sumplet .	3	5	
5&6.		=			ł				-12.5		2	- -E	25
S		-=									İ	Ē	
SF 55		_=										Ē	
38615215 /3/03 SFWMD ST5&6.GP.		_=										F	_27
1,38	-16.0	28.5		SAND, fine, greenish gray, trace shell, (and .	100	9		евт	Sampler		E	
~-1		70.0		SAND, Tine, greenish gray, trace shell, (clay (SP)	AHU	100	3			oumpier _	<u>6</u> 9	19	
ًارہ ≤	-17.5	30.0 =		BORING TERMINATED AT 30 FEET ON					-17.5		10	13	_30
Z Š		-=		11/23/2004							ŀ	E	
JOB NUM										<u></u>			
URS ARMY													
	NG FORM 18	76 6100	0.00015015	SEVMIN RORING LOGS/revisions 2 3 05/h-26d	2 (22 (2005 107	MA POP						

			·				H	ole N	lo. CP05-		CB-0027
DRILLI	ING LOG	DIVI	SION	INSTALLATIO	ON					SHEET OF 1	1 Sheet
1. PROJECT				10. SIZE A	ND TYPE	OF BIT	S	ee rer	marks	Tor 1	SHEET
	A 5/6 EXP.	ANSION	DESIGN	11. COORD	INATE SYS	TEM\DAT			DISTURBED	UNDISTU	
2. LOCATION CO FLORIDA		67(E).Y=	=757808.29(N)	12. MANUF	ACTURER'S	S DESIGNA	TION OF	DRILI	NAD83	: NG\	/D29
3. DRILLING AGE	NCY			Mobile		J DESIGNA	mon or	DIVICE			
WILLIAMS 4. BORING DESIG	EARTH SCIE	NCES		13. TOTAL	SAMPLES			DISTUR		UNDISTURBE	
	SN-CB-002	27		14. TOTAL	MIMDED	CODE BOX	re.	:	9 0	: (,
5. NAME OF DRI	ILLER			15. ELEVAT							
JOHN 6. DIRECTION OF	F HOLE			16. DATE 1			: STARTI	ED	; CC	MPLETED	*
VERTICAL		ICLINED	DEG. FROM VERT.					1/23,	/2004	11/23/	2004
7. THICKNESS O	F OVERBURDEN		N/A Ft.	17. ELEVAT					+12.5 F	t.	11/4 **
8. DEPTH DRILLE	ED INTO ROCK		19.5 Ft.	18. TOTAL 19. SIGNAT							N/A %
9. TOTAL DEPTH	OF HOLE		30.0 Ft.	To: Sional	OIL AID				Geologist		
ELEVATION	DEPTH	9	CLASSIFICATION OF MATERIALS		*	8,4	RQD		DELLADIC	15/ FT-	UE
		LEGEND	(Description)		REC	BOX OR SAMPLE	OR UD		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
+12.5	0.0	V	SAND, tan to yellow, silty, with rock (ro	oadway	33	1			SPT Sampler	23	
			fill) (SP)					.405		18	21
			With limestone		50	2		+10.5	SPT Sampler	<u>2</u>	
	=		Brown to yellow, slightly clayey, with weathered limestone							9 4	11
+8.5	4.0		LIMESTONE, tan to yellow, slightly clayey		50	3		+8.5	SPT Sampler	2	
- <u>-</u> -	十二字		silty, weathered (LS)	,,		_				4 7	6
			Ct		50	4		+6.5	SPT Sampler	3	
	_=		Clayey		30	4			ori odnipiei	2	19
								+4.5		- <u>11</u> <u>17</u>	
					50	5		+3.7	SPT Sampler	<u>12</u>	
											>50
					1						
			Tan, slightly clayey, trace shell		83	6			SPT Sampler	2	
								-2.5		15	35
					ŀ						
			: 								
		1	Gray, sandy, with shell		78	7			SPT Sampler		
			ordy, sundy, with shell			•		-7 . 5	or r oumplor	5	11
								7,0			
			1		Ì						
•					ł						
-11.0	23.5				Í						
			SILTY SAND, fine, gray to dark gray, cl	ayey,	83	8			SPT Sampler		
			with shell (SM)					-12,5		- 5	9
	28.5										
-16.0	28.5					_					
			SILT, fine, dark gray, sandy, clayey, tra shell, medium stiff (ML)	ice	100	9			SPT Sampler	$\frac{2}{3}$	
-17.5	30.0		BORING TERMINATED AT 30 FEET ON					-17.5		5	8
			11/23/2004		İ						
	=										
NG FORM 18	336 G:\296\3	88615215	SFWMD\BORING LOGS\revisions 2_3_05\b-27.0	1/23/8 gwk	2005 10:1	.0:36 AM I	T27		<u> </u>		

		- Loui		Liverus (re			H	ole No	c. CP05-		
DRILL	ING LOG	DIV	ISION	INSTALLATIO	M					SHEET OF 1	1 Sheets
1. PROJECT				10. SIZE A	ND TYPE	OF BIT	S	ee rem	narks	101	JIICET
SFWMD S	TA 5/6 EX	(PANSION	DESIGN	11. COORD	INATE SYS	STEM\DAT			DISTURBED	UNDISTU	RBED
2. LOCATION CO		9 54(F) Y	=757818.98(N)	12. MANUF	ACTUBED'S	C DECICNA	TION OF	DDII I	NAD83	: NG	VD29
3. DRILLING AGI		3.0 1(2),1	-707010.00(N)	Mobile		3 DESIGNA	MION OF	UKILL			
WILLIAMS		IENCES		13. TOTAL				DISTURE		UNDISTURBE	
4. BORING DESI	ignation A5N—CB—0	1028						:	9	: ()
5. NAME OF DR		020		14. TOTAL					0		
JOHN				15. ELEVAT	ION GROL	JND WATE	: STARTI		.2 Ft.	OMPLETED	
6. DIRECTION O		l mornies	PEO EDOU MENT	16. DATE E	ORING			1/23/		11/23/	2004
VERTICAL		INCLINED	DEG. FROM VERT.	17. ELEVAT	ION TOP	OF BORIN	G		+11.7 F	īt.	, , , ,
7. THICKNESS (N/A Ft.	18. TOTAL	CORE REC	COVERY FO	OR BORIN	G		_	N/A %
8. DEPTH DRILL 9. TOTAL DEPTH		<u> </u>	N/A Ft. 30.0 Ft.	19. SIGNAT	URE AND	TITLE OF	INSPECTO				
3. IUIAL DEFIR	T OF HOLE		CLASSIFICATION OF MATERIALS	<u> </u>		~		Beau			
ELEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
	0.0	9	2000	1 (00)			UD		007.0		>
+11.7	0.0		SAND, fine, gray, trace shell, and roo	is (SP)	8	1			SPT Sampler	116	10
	=		}					+9.7		4	
	1 =		Dark brown, trace organics		50	2		_	SPT Sampler	4	
+8.2	3,5		·					+7.7		9	14
7	$\Psi \equiv$	P#	LIMESTONE AND SAND, fine, light brown clayey, caprock, weathered (LS-SP)	,	58	3		71.1	SPT Sampler	50 15	
•	T									913	22
	=				50	4		+5.7	SPT Sampler	<u>27</u>	
	=		-			•			or r Sampler	35	85
	=		1					+3.7		50 50	
	! _≣				0	5			SPT Sampler	50	>50
+2.2	9.5		SAND, fine, gray, trace shell, trace clay	, (SP)				+1.7			
			Jakes, thie, gruy, nace stien, nace ciu;	, (31)							
	=										
	=		Light brown, trace sand, and shell		67	6			SPT Sampler		
								-3.3		<u>11</u>	20
				1	l						
] (_200_13.0%22%) (50)		100	,			CDT C!		
			(-200=13.9%, w=22%) (SC)		100	7			SPT Sampler	<u>6</u> 8	13
			1	}		-		-8.3		5	
				1	ł						
44.4	ا ا				l	ļ					
-11.8	23.5	///	CLAYEY SAND, fine, greenish, trace shel	ı (sc)	100	8			SPT Sampler		
		///	,, g					-13.3	F		2
	=			ľ							
		///			-						
	=	///									
		///		į							
	=	///			100	9			SPT Sampler		
		. / . / . /				-	,	-18.3		-4-	9
-18.3	30.0							10.0		1	
	30.0		BORING TERMINATED AT 30 FEET ON				-	10.0		-3.	
-18.3	30.0	<i>L </i>	BORING TERMINATED AT 30 FEET ON 11/23/2004					10.5		3.	
-18.3	30.0	<i>Z:::Z:::Z</i> :.	BORING TERMINATED AT 30 FEET ON 11/23/2004					10.0			

		1200					H	ole No	. CP05-		B-0029
DRILLIN	IG LOG	DIVI	SION	INSTALLATIO)N					SHEET OF 1	1 Sheet
1. PROJECT	 			10. SIZE A	ND TYPE	OF BIT	Se	e rem	arks	1 1 1	SHEET
SFWMD STA	5/6 EXPA	NOISN	DESIGN	11. COORD					ISTURBED	UNDISTUR	
2. LOCATION COOF		3(F) Y=	=757810.04(N)	12. MANUF	ACTUDED'	DESIGNA	TION OF	DDII i	NAD83	: NGV	/D29
3. DRILLING AGEN		J(L),1-	-737010.04(N)	Mobile		DESIGNA	HUN OF	UKILL			
WILLIAMS EA		CES		13. TOTAL				DISTURBE		UNDISTURBE	D
4. BORING DESIGN CPO5-STA5		O		i 					9	: 0)
5. NAME OF DRILL		.3		14. TOTAL					00		
JOHN				15. ELEVAT	ION GROU	ND WATER			3 Ft.	NADI ETED	
6. DIRECTION OF I				16. DATE I	BORING		: STARTE	ม 1/30/2		OMPLETED 11/30/2	2004
▼ VERTICAL	INC	CLINED	DEG. FROM VERT.	17. ELEVAT	ION TOP	OF BORING		.,, .	+11.8		
7. THICKNESS OF			N/A Ft.	18. TOTAL	CORE REC	OVERY FO	OR BORING	;			N/A %
8. DEPTH DRILLED			18.5 Ft.	19. SIGNAT	URE AND						
9. TOTAL DEPTH C	OF HOLE		30.0 Ft.	<u> </u>			J. Lan	gley, Ge	eologist		
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)		% REC	BOX OR SAMPLE	RQD OR UD		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
+11.8	0.0	1	LIMESTONE, tan, clayey, weathered, with		25	1			SPT Sampler	9	
	=		shell (LS)					10.0		14	18
	====		Brown to yellow		25	2		+9.8	SPT Sampler	4	
4	, 丰	L,	,						•	<u>5</u>	11
Ψ	- -		Proven to vollow agendy		50	3		+7.8	SPT Sampler	7	
[Brown to yellow, sandy		30	3			or i sumpler	<u>6</u> 8	18
ł	_=							+5.8		10 12	10
ŀ			Brown to tan		100	4		+5.1	SPT Sampler	8 50	
j	===									30	>50
+3,3	8.5		Tan (w=16%, LL=19%, PI=3%)		50	5			SPT Sampler	14	
}	<u></u>	4//	CLAY, light gray, with weathered limesto	one,						10	19
	4	1/	stiff (CL-LS)					+1.8		5	
		$\mathbb{I}//$									
		$\mathbb{I}//$									
				;	ļ						
-1.7	13.5	74	LIMEGRANG IS II III		70				CDT Cl		
	+		LIMESTONE, light gray, silty, sandy, weathered (LS)		78	6			SPT Sampler	<u>6</u> 4	22
İ	-	++-		`				-3.2		18	22
	====	11-									
		1-1-1									
		+ + + +			[
	‡	+++	Slightly clayey, with shell		67	7			SPT Sampler		
	*	++++				·		~8.2	F	- 8	14
											
	#	 			İ						
	=	111									
-11.7	23.5			j							
-114			LIMESTONE AND CLAYEY SAND, medium		100	8			SPT Sampler	5	
	_]_/		to fine, gray, with shell, weathered (LS-	-sc)				-13.2		<u>9</u>	29
				ĺ							. —
] /										
-16.7	28.5										
			SAND, dark gray, silty (SP)		56	9			SPT Sampler	11	
-18.2	30.0		L					-18.2		- 17 17	34
			BORING TERMINATED AT 30 FEET ON 11/30/2004	j							
				ł							
											
				I		J	1				

		·						Н	ole No	. CP05-	-STA5N-(B-0030	
	DRILLI	NG LOG	DIVI	ISION	INSTALLATIO)N					SHEET OF 1	1 Sheets	
1.	PROJECT				10. SIZE A	ND TYPE	OF BIT	S	ee remo	arks	Jor 1	SULEIS	İ
	SFWMD ST		(PANSION	DESIGN	11. COORD	INATE SYS	TEM\DAT			STURBED	UNDISTU		}
	LOCATION CO		3.87(E),Y:	=757803.94(N)	12. MANUF	ACTURER'	DESIGNA	TION OF	DRILL	NAD83	: NG	VD29	
3.	DRILLING AGE	NCY			Mobile	B53							
	WILLIAMS E		IENCES	<u> </u>	13. TOTAL	SAMPLES			: DISTURBE	D 9	: UNDISTURBE	.D)	
	CP05-STA	5N-CB-0	030		14. TOTAL	NUMBER	CORE BOX	ES	<u> </u>	0	- '	<i>'</i>	
	name of dri JOHN	LLER			15. ELEVAT	ION GROU	ND WATE	R	9.1	Ft.			
	DIRECTION OF	HOLE			16. DATE E	BORING		START	ED 1/24/2		OMPLETED 11/24/	2004	
	VERTICAL		INCLINED	DEG. FROM VERT.	17. ELEVAT	ION TOP	OF BORIN		1/24/2	+12.6		2004	
1	THICKNESS OF			N/A Ft.	18. TOTAL	CORE RE	OVERY F	OR BORIN	G			N/A %	
ļ	DEPTH DRILLE TOTAL DEPTH			N/A Ft. 30.0 Ft.	19. SIGNAT	URE AND				-11-4			
				CLASSIFICATION OF MATERIALS	<u> </u>			· · · · · ·	gley, Ge I	ologist			
	ELEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	RQD OR UD		REMARKS	BLOWS/ 0.5 FT-	N- VALUE	0.
	+12.6	0.0		SAND, fine, light brown, timerock, trace	root (SP)	58	1			SPT Sampler	20		_ " .
					Ì				+10.6		<u>21</u>	37	Ē
	_			Silty, trace shell, trace dark brown san	d, trace	25	2			SPT Sampler			2.
	+8.6	4.0		organics							<u> </u>	16	<u>-</u>
	+0.0	4.0		LIMESTONE AND SAND, fine, light brown	· \	67	3		+8.6	SPT Sampler	- 1 - 7		Ξ Ε .
Ì		-=		with limestone fragments, trace shell (I	LS-SP)						11	30	<u> </u>
				Light gray, trace clayey sand, and shel	ı	54	4		+6.6	SPT Sampler	<u>8</u> 4		Ē
				(-200=25.5%, w=16%) (SC)							2 7	9	<u> </u>
			7	<u> </u> <u> -</u>		67	5		+4.6	SPT Sampler	12		=
1			一门			1					- <u>12</u> 50	62	=
1				Clayey					+2.6			F	<u>-</u> 10
					;								=
													<u>-</u> 12
			ᅫ/	(-200=24%, w=15%)									=
		-	寸[/]			67	6		Ì	SPT Sampler	5	20	Ξ
		=	귀 : [ŀ				-2.4		11		<u> </u>
1		=										Ė	=
1		=	<u> </u>										<u>.</u> 17
												F	=
İ		=		Trace shell		78	7			SPT Sampler	<u>6</u> 13	F	=
725/05			4		ŀ				-7.4		11	24	<u>-</u> 20
1/2	j	<u>=</u>	井	·		ŀ							-
1836.GDT			귀							4		F	- - 22
183	-10.9	23.5	开门									ŧ	_** - -
Q V	<u>`</u>		V. 6.V.	SAND, gray to light gray, with shell, tra	ice rock	67	8		:	SPT Sampler	17		-
¥6.6P.				(SP)	[-12.4		<u>16</u>	35	25
D ST5&6.	i	#									•		-
SFWI												E	
11/3/03 SFWHD				,								F	<u>-</u> 27.
=	Ì			Gray, trace cemented sand		89	9		;	SPT Sampler	14	F	-
	-17.4	30.0		Decline Telling					-17.4		17 16	33	30.
CORP_LOGS				BORING TERMINATED AT 30 FEET ON 11/24/2004							[Ė	:
흥		=		,-,-									:
ARMY													
	FORM 18	36 G/296	\38615215 :	SFWMD\BORING LOGS\revisions 2_3_05\b-30.d	wg 3/23/2	005 10:1	6:34 AM E	ST					

							H	<u>ole No.</u>	<u> CP05-</u>		CB-003
TID	C LOG	DIVI	SION	INSTALLAT	ION					i	1
	15200	i								OF 1	SHEET
NOTE CONTINUE STANDARD CONTINUE STANDARD CONTINUE CO											
SISTALLIDION											
		IU(E) A-	-757798 24(N)	10 1/41/11	FACTURED!	DECION.	TION OF	DDII I	NAD83	· NG\	/D29
		10(2),1-	-707730.24(11)			S DESIGNA	ATION OF	UKILL			
		NCES						DISTURBED		UNDISTURBE	n .
				1 10. 10	. Ortimi EEO			_			
CP05-STA	ROJECT FOWMD STA 5/6 EXPANSION DESIGN OCATION COORDINATES LORIDA X=694816.10(E),Y=757798.24(N) RILLIDA GENEY FILLIAMS EARTH SCIENCES ORING DESIGNATION FILLIAMS EARTH SCIENCES ORING DESIGNATION FOR DRILLER OHN RECTION OF HOLE VERTICAL INCLINED DEG. FROM VERTI. HICKHESS OF OVERBURDEN N/A F1. LEVATION DEPTH STAL DEPTH OF HOLE CLASSIFICATION OF MATERIALS (Description) TO ALL DEPTH STAL DEPTH OF HOLE LEVATION DEFTH DRILLED INCLINED LEVATION DEFTH DRILLED INTO ROCK 24.0 F1. 19. SIGNATURE AND RECTION OF MATERIALS (Description) TO ALL DEPTH STAL DEPTH OF HOLE LEVATION DEPTH STAL DEPTH OF HOLE LEVATION DEPTH STAL DEPTH OF HOLE LEVATION DEPTH STAL DEPTH OF HOLE LIMESTONE AND PEAT, fan yellow, (LS-PT) Weathered (LS) Yellow ion Ton yellow, with sandy clay, calcareous Ton, sandy 78 78							_			
NRSTALAIDN											
1. FROLET 11. SEZ AND TYPE OF BIT SOE PRITTING STEET 11. COORDINATE STSTEMAN STAE SOE PRITTING STEET 11. COORDINATE STSTEMAN STEET 11. COORDINATE STSTEMAN STEET STEED											
PROJECT STATE S											
	IN	CLINED	DEG. FROM VERT.	17 FIEVA	TION TOP	OF BODIN		2/0/200			
7. THICKNESS OF	F OVERBURDEN		N/A Ft.	-					T13.1 F	l.	11/1 4
8. DEPTH DRILLE	D INTO ROCK										N/A %
	 			19. SIGNA	JURE AND				aiot		
S. TOTAL DEFIN	OF HOLE						J. Land	jiey, Georg	ogisi		
ELEVATION	DEPTH	8				뜡			REMARKS	SŠ-F	- ≒
		EGE	(Description)		REC	SAM			MEMPHING.	0.5 0.5	VAI
+15.1	0.0		SAND, fine, tan, with limerock (fill) (SI	9)	17			SPT	Sampler		
			(111)	,		•				34	51
+13.1	2.0							+13.1		17	٥,
			LIMESTONE AND PEAT, tan yellow, (LS-F	ነፐ)	33	2			Sampler		
-	Ŋ <u></u>	1	weathered, caprock						-	- 6 -	13
7	<u> </u>	117	•							7	
1		中世	(OC=7%)		17	3		SPT	Sampler	2	
		井쓰			1 1						2
+9.1	6.0 =	4	LIMESTONE tan elevery and pilt and a	hali	77	-		+9.1	Sampler		
		++++		11611,] 33	•		3/ 1	Jumpier .		10
	1 1	111	Yellow tan		1 1			17 1	-	9	10
j		.1.,1.,	Tan vellow, with sandy clay, calcareous		33	5		SPT	Sampler	3	
	_=		,,						•	8	16
	=====================================	T-1-1-1]			+5.1	-	8	10
										J	
											
ļ											
	│ ॗ	┸┰┸┧			i					İ	
									_		
			Tan, sandy		78	6		SPT	Sampler _	9	
	=	┰┸┰╢						+0.1		12	36
					1						
	_==										
			•			_					
					78	7		SPT	Sampler _		
		┰╵┰┤					L	-4.9			55
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	<u></u>	++++									
	_=	1,1,			1 1					1	
		<u> </u>			:_						
		<u> </u>			89	ď		SPT	Sampler _	- 7 0	
	=	, 						-9.9	-	9	18
	=	+++1								ļ	
	量	++++			1 1						
		╧╌									
	_=										
						_		ar~	C		
	-=-	777			4/	9			Sampler	6 34	
-14.9	30.0	<u>, , , , , , , , , , , , , , , , , , , </u>						-14./		50	84
ļ	URS Coredrat	ion	BORING TERMINATED AT 30 FEET ON								ł
ļ.	7800 Constre	ss Aven	e, sufte 200								
F	Boca Ra to h, F	FL 3348	7					· ··			
									(Cont	inued)	
	15. DATE BORNO SIATED COUNTETED CO										

								Н	ole No.	CP05-	-STA5N-C	B-0032	2
	DRILLI	ING LOG	DIV	ISION	INSTALLATIO	ON					SHEET OF 1	1	
	1. PROJECT				10. SIZE A	ND TYPE	OF BIT		ee rema	rks	OF 1	SHEET	1
	SFWMD ST	A 5/6 E	XPANSION	DESIGN	11. COORD					TURBED	UNDISTUR	RBED	1
	2. LOCATION CO		6 11(E) Y	=759461.65(N)	40	. ozupeni	0. 0.5010111	TION OF	:	NAD83	: NG\	/D29	1
	3. DRILLING AGE		0.41(L),1	-739401.03(N)	12. MANUF Mobile		5 DESIGNA	TION OF	DKILL				
	WILLIAMS		CIENCES	<u> </u>	13. TOTAL				DISTURBED		UNDISTURBE	D	1
	4. BORING DESIGNATION OF A CPOS-STA		ากรว						:	9	<u> </u>)	
	5. NAME OF DR		7032	······································	14. TOTAL					0			1
	JOHN				15. ELEVAT	TION GROU	JND WATE	: START	10.4		OMPLETED		-
	6. DIRECTION OF		l warmen	DEG. FROM VERY	16. DATE 1	BORING			12/3/20		12/3/2	004	1
	▼ VERTICAL] INCLINED	DEG. FROM VERT.	17. ELEVAT	ION TOP	OF BORIN			+14.4			1
	7. THICKNESS 0			N/A Ft.	18. TOTAL	CORE REC	COVERY F	OR BORIN	G		•	N/A %	1
	8. DEPTH DRILLI 9. TOTAL DEPTH		.K	5.0 Ft. 30.0 Ft.	19. SIGNAT	URE AND				1!-1		•	1
	9. IUIAL DEFIN	OF HOLE	1	CLASSIFICATION OF MATERIALS	l		•		gley, Ged	nogisi			ł
	ELEVATION	DEPTH	LEGEND	(Description)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- Value	
			9	CAND C. P. L. L.				UD	ļ	DT CI		>	0.0
	+14.4	0.0		SAND, fine, light brown, trace silt, and limestone (fill) (SP)		50	1		S	PT Sampler	<u>22</u>	34	E
									+12.4		10	34	Ē
		7 4.0				8	2		S	PT Sampler	3		2.5
	+10.4	7 4.0 ■							+10.4			3	E
	110.4	- 1.0		LIMESTONE AND SAND, fine, light brown,	,	17	3		S	PT Sampler			Ē.,
				silty (LS-SP)								2	=_5.0 =
	+8.4	6.0	177	SAND, fine, light brown, clayey, with		100	4		+8.4 S	PT Sampler	- <u>9</u> - 8		E
		=		limestone fragments (-200=29.7%, w=2	7%) (SC)					•	8 11	19	E - 7.5
		=				33	5		+6.4	DT C1	30		Ē,
			///			33	3		,	PT Sampler	<u>- 15</u> - 7	19	Ę
			///						+4.4		<u>12</u>	13	10.0
													F
													Ē
		=											12.5
	+0.9	13.5											E
				CLAY, light gray, weathered, trace limes (-200=52.2%, w=17%, LL=25%, PI=7%)	tone (CL)	83	6		l	PT Sampler	14		Ē
		-		(200-02/2%, #=17%, 22-20%, 1/=7%)	(02)				-0.6		20	38	=_15.0 =
													Ē
		_=		}		1							E
					İ		:						E 17.5
	-4.1	18.5	111	LIMESTONE, light gray (LS)		67	7		s	PT Sampler	14		Ē
,]		•		-5.6		19	35	E 20.0
/20/05											10		E
_						•							E
1836.GDI													E_22.5
18	9.1	23.5											Ė
Ą	,		10	SAND AND SHELL, fine, light gray, some		44	8		s	PT Sampler	_ 9		Ē
ST5&6.GPJ		28.5	1 / (crushed sand, trace limestone (SP)					-10.6		<u>- 8</u>	14	<u>_</u> 25.0
ST5&													E
진물			(0)		ļ								E
1521) م ا										<u>-</u> 27.5
38615215 11/3/03 SFWMD	-14.1	28.5	ر پار	CAMPY OLAY						nr.c. :			=
=1				SANDY CLAY, grayish green, sandy clay, trace shell (SP)		78	9		•	PT Sampler	4	9	E.
NO SI	-15.6	30.0 =		BORING TERMINATED AT 30 FEET ON					-15.6		5		= 30.0 =
문의				12/3/2004									Ė
S S													F
URS ARMY		<u> </u>											
	NG FORM 18	36 G/296	38615215	SFWMD\BORING LOGS\revisions 2_3_05\b-32.d	wa 3/23/2	2005 10:1	8:31 AM E	T2:					

_										Н	ole No	. CP05-	-STA5N-(CB-003	3
	DRILLI	NG LOG	DIVI	ISION			INSTALLATI	ON					SHEET	1]
1	. PROJECT				·	· · · · · · · · · · · · · · · · · · ·	10. SIZE	AND TYPE	OF RIT		e rem	arke	OF 1	SHEET	-
	SFWMD ST	A 5/6 E	XPANSION	DESIGN			11. COOR					ISTURBED	: UNDISTU	RBED	1
]2	LOCATION CO		n 74/E\ v.	=760410.74(M\		<u></u>				:	NAD83	- NG	VD29	_
3	. DRILLING AGE		U.74(E),1-	-/60410./4(<u> </u>		12. MANUI Mobile		S DESIGNA	ATION OF	DRILL				1
1	WILLIAMS	EARTH SC	CIENCES		·		13. TOTAL			···	: DISTURBE	ED .	: UNDISTURBE	ED .	1
4	. BORING DESIGNOUS CP05-STA		1033							····	:	9	<u> </u>	0	1
5	. NAME OF DRI		1033				14. TOTAL					0			1
	JOHN						15. ELEVA	TION GROU	JND WATE	R STARTI		3 Ft.	OMPLETED		_
6	DIRECTION OF] 1001 1115			DEG FRAM MERT	16. DATE	BORING			12/3/2	004	12/3/2	2004	
-	VERTICAL CONTROL] INCLINED			DEG. FROM VERT.	17. ELEVA	TION TOP	OF BORIN			+10.8			1
_ ⊢	. THICKNESS O . DEPTH DRILLE				N/A		18. TOTAL	CORE RE	COVERY F	OR BORING	3			N/A %	1
-	. TOTAL DEPTH				N/A 30.0		19. SIGNA	TURE AND							1
F			Τ -			N OF MATERIALS	l				gley, Ge	eologist		1	┨
	ELEVATION	DEPTH	LEGEND			cription)		% REC	BOX OR SAMPLE	RQD OR		REMARKS	BLOWS/ 0.5 FT-	N- VALUE	ł
ļ.	+10.8	0.0 =		CAND Co.	J-al. L	, trace silt, and				UD		CDT C 1	38	>	0.0
	T10.0	0.0 =		organics (SP)	jark brown)	, trace siit, and		50	1			SPT Sampler	3	5	E
											+8.8		2	J	Ė
	7	Z _		Silty, with lin	nestone fra	igments		50	2			SPT Sampler	2	1	E_2.5
	- <u>-</u>			-							+6.8		2	6	E
				Light brown		,		63	3		10.0	SPT Sampler	10		E 5.0
- 1													8 8	16	F 3.0
								21	4		+4.8	SPT Sampler	<u>17</u> 50	 -	Ē
			777				•					•	50	>50	7.5
				light gray c	lavev (=20i	0=28.4%, w=12%	() (SC)	25	5		+2.8	SPT Sampler	2	ļ .	E
		=		Light gruy, c	14,6, (201	U-20.4%, #-12%	, (30)		J			or i oumprer	16	66	Ė
4		_=									+0.8		50	00	E_10.0
		_=													Ē
		_=													Ė
1		\equiv													<u>-</u> 12.5
				(-200=29.9%,	17%\ /	(co)		67	6			CDT Camalan			Ē
				(-200-29.9%,	, W-1/ <i>/</i> //	(30)		"				SPT Sampler	5	11	ŧ.,,
1											~4.2		6	''	15.0 _
ŀ		-=													Ė
		=													E _17.5
ı		=													E
								67	7			SPT Sampler	- 6		Ė
55		=									-9.2		<u>14</u> 22	36	<u>_</u> 20.0
1/20/02]							Ē
į															E
836.0															22.5
ACE_1835.GDT															Ē
								56	8	1	*	SPT Sampler	10 12	20	E
ST5&6.GPJ		=									-14.2		8	20	<u> 25.0 </u>
TS OF				1											Ē
215 S¥	}	_=								İ			İ		27.5
38615215 11/3/03 SFWMD							ļ								ا۔''ءَ ا
2 E	- [_=		Trace limestor	ne fragmen	nts	ĺ	67	9		:	SPT Sampler	4		Ē
_	-19.2	30.0].	-19.2	•	- 5	11	E 30.0
≩ີຊ[BORING TERMIN 12/3/2004	NATED AT 3	SO FEET ON							•		E
JOB NUK CORP LOGS	ĺ		, 1	12/3/2004											Ē
ORS J															
j \$ ⊂ EN(FORM 18.	36 G:\296	38615215 \$	SFWMD\BORING L	OGS\revision	ns 2_3_05\b-33.d	wo 3/23/8	005 10:1	9:24 AM F	TZT		· — - · · · · · · · · · · · · · · · · ·			j

DRILLING LOG FOR SINCE								Но	le No	. CP05-		B-0034
1. PROJECT 1. PROJECT 1. CORCINET ORDERINAS 5. PROJECT 1. CORCINET CORRESTAND 1. CORCINET CORRESTAND 1. CORCINET CORRESTAND 1. CORRES	DRILLI	ING LOG	DIVIS	SION	INSTALLATIO	N						1
10.000 10.000 10.000 10.000 10.000 10.0000 10.00000 10.000000 10.000000 10.0000000 10.0000000 10.00000000 10.00000000 10.00000000 10.00000000 10.00000000 10.00000000 10.00000000 10.00000000 10.00000000 10.0000000000												
DRILLING LOG												
Mobile 653 Mobile SCENETS DEFUNED DEFU	2. LOCATION CO	ORDINATES					-		:		•	
WILLIAMS EARTH SCENCES 13. TOTAL SMPLES DISTURBED DISSURD			38(E),Y=	=761268.05(N)			DESIGNA	TION OF	DRILL			
4. DRIAN DESIGNATION 9 0			NCES						DICTUDO	·	· HADICTUDDE	<u> </u>
14. TOTAL NUMBER CORE BOXES 0			ITOLS		13. IUIAL	SAMPLES			DISTURB		-	
S. NAME OF DRILLER	CP05-STA	A5N-CB-003	34		14. TOTAL	NUMBER	CORE BOX	ES			<u> </u>	
16. DATE BORING 11/2/3/2004 12/3/20		ILLER			ļ				1(
NECLINES DELENSES OF OVERHIDED DELENSES OF OVERHIDED N/A FI.		E HOLE			 						MPLETED	
7. INCOMESS OF OVERSURDEN 1. REFINE BULLED NTO BOICK 7. O. FT. 1. SIGNATURE AND THE OF OF BRIEFICITY 1. SIGNATURE AND THE OF SPECIETY 1.			CLINED	DEC EPON VEDT	16. DATE E	BORING		<u> </u>	2/3/2	2004	12/3/2	004
8. DEPTH DEALED WID BOOK			VUILLO		17. ELEVAT	ION TOP	OF BORIN	G		+14.5 F	Ħ.	
9. TOTAL PEPTH OF HOLE 1. CLASSIFICATION OF MAICHAILS 1. ELEMATION 1.					1							N/A %
CLASSIFCATION DEPTH B					19. SIGNAT	URE AND						
#14.5 0.0	9. TOTAL DEPTH	I OF HOLE		,	<u> </u>	ı		J. Lang	ley, G	eologist		
#14.5 0.0	ELEVATION	DEPTH	S	1	ا	%	OR IPLE			REMARKS	WS/	ΤĦ
#12.5 2.0			150	(bescription)	-	REC	SAN				BLO 0.5	× ¥
#12.5 2.0	+14.5	0.0		LIMESTONE, tan (fill)		50	1		~~~~	SPT Sampler		
112.5 2.0 2.0 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1		=====================================	SAME SAME									
#8.5 Complete Comp	+12.5	2.0	1, 11, 1	DEAT 1	70/	E0.			+12.5	CDT Camples	9	
He He He He He He He He			BOYSION									
#8.5 6.0 W W W W W W W W W W W W W W W W W W W	7	1/ =	DIVISION									
#8.5 6.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5		T		(w=202%, OC=34%) (PT)		63	3			SPT Sampler	2	
HIMESTONE AND SILTY SAND, grayish (LS-SM) 12 46.5 SPT Sampler 7 7 14.5 SPT Sampler 12 46												5
brown (w=21%, LL=23%, Pl=5%) (LS-SM) +1.0	+8.5		7 77 7	LINESTONE AND SURV. CAND		67			+8.5	CDT C1		
+1.0 13.5 LIMESTONE AND CLAYEY SAND, grayish (LS-SC)				LIMESTONE AND SILIT SAND, grayish brown (w=21%, LL=23%, PI=5%) (LS-SI	v)	63	4			SPI Sampler		40
+1.0 13.5 LIMESTONE AND CLAYEY SAND, grayish (LS-SC) 83 6 SPT Sampler 8 3 14 -9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 6 8 SPT Sampler 5 12 -14.0 28.5 SAND, sand, light gray, with shell, and marl (SP) 100 9 SPT Sampler 5 5 10 BORING TERMINATED AT 30 FEET ON 12/3/2004		=		2.00.00 (0. 2.00, 2.2.2.00, 1.1.000) (2.0.000)	"/	1			+6.5			12
+1.0 13.5 LIMESTONE AND CLAYEY SAND, grayish (LS-SC)						67	5		10.5	SPT Sampler		
+1.0 13.5 LIMESTONE AND CLAYEY SAND, grayish (LS-SC)												23
+1.0 13.5 LIMESTONE AND CLAYEY SAND, grayish (LS-SC)		_=							+4,5			
+1.0 13.5 LIMESTONE AND CLAYEY SAND, grayish (LS-SC)		=									Ì	
+1.0 13.5 LIMESTONE AND CLAYEY SAND, grayish (LS-SC)								1				
+1.0 13.5 LIMESTONE AND CLAYEY SAND, grayish (LS-SC)								1			-	
LIMESTONE AND CLAYEY SAND, grayish (LS-SC) 83 6 SPT Sampler -0.5 SPT Sampler 7 -14.0 28.5 LIMESTONE, brown, trace cemented clay (LS) SAND, sand, light gray, with shell, and marl (SP) -15.5 SAND, sand, light gray, with shell, and marl (SP) BORING TERMINATED AT 30 FEET ON 12/3/2004	+1.0							1				
-9.0 23.5 SAND, sand, light gray, with shell, and mart (SP) 100 9 SPT Sampler 5 10 BORING TERMINATED AT 30 FEET ON 12/3/2004		=/		LIMESTONE AND CLAYEY SAND, grayish (LS-SC)	83	6			SPT Sampler		
-9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 14.0 28.5 SAND, sand, light gray, with shell, and mart (SP) BORING TERMINATED AT 30 FEET ON 12/3/2004 SPT Sampler 5 -15.5 5 10]/							-0.5			14
-9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 14.0 28.5 SAND, sand, light gray, with shell, and mart (SP) BORING TERMINATED AT 30 FEET ON 12/3/2004 SPT Sampler 5 -15.5 5 10												
-9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 14.0 28.5 SAND, sand, light gray, with shell, and mart (SP) BORING TERMINATED AT 30 FEET ON 12/3/2004 SPT Sampler 5 -15.5 5 10		=]/										
-9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 6 8 SPT Sampler 5 14 14 15 15 10 10 9 SPT Sampler 5 10 10 9 SPT Sampler 5 10 10 12/3/2004 SAND, sand, light gray, with shell, and mart (SP) 100 9 SPT Sampler 5 10 10 12/3/2004		-=/										
-9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 14.0 28.5 SAND, sand, light gray, with shell, and mart (SP) BORING TERMINATED AT 30 FEET ON 12/3/2004 SPT Sampler 5 -15.5 5 10		_=/			}							
-9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 14.0 28.5 SAND, sand, light gray, with shell, and mart (SP) BORING TERMINATED AT 30 FEET ON 12/3/2004 SPT Sampler 5 -15.5 5 10				With clay		83	7			SPT Sampler	7	
-9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 6 8 SPT Sampler 5 14 14 15 15 10 10 9 SPT Sampler 5 10 10 9 SPT Sampler 5 10 10 12/3/2004 SAND, sand, light gray, with shell, and mart (SP) 100 9 SPT Sampler 5 10 10 12/3/2004				Time diay			Ť				1	12
-9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 6 8 SPT Sampler 5 14 14 15 15 10 10 9 SPT Sampler 5 10 10 9 SPT Sampler 5 10 10 12/3/2004 SAND, sand, light gray, with shell, and mart (SP) 100 9 SPT Sampler 5 10 10 12/3/2004								_	-5.5		5	
-9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 14.0 28.5 SAND, sand, light gray, with shell, and mart (SP) BORING TERMINATED AT 30 FEET ON 12/3/2004 SPT Sampler 5 -15.5 5 10		=										
-9.0 23.5 LIMESTONE, brown, trace cemented clay (LS) 6 8 SPT Sampler 5 6 14 -14.0 28.5 SAND, sand, light gray, with shell, and marl (SP) 100 9 SPT Sampler 5 5 5 10 BORING TERMINATED AT 30 FEET ON 12/3/2004			/ -									
-14.0 28.5 SAND, sand, light gray, with shell, and marl (SP) 100 9 SPT Sampler 5 10 10 10 10 10 10 10 10 10 10 10 10 10			/ [_]		1							
-14.0 28.5 SAND, sand, light gray, with shell, and marl (SP) 100 9 SPT Sampler 5.	-9.0	23.5	$A\Box$	L	.,		_					
-14.0 28.5 SAND, sand, light gray, with shell, and marl (SP) 100 9 SPT Sampler 5 5 10 BORING TERMINATED AT 30 FEET ON 12/3/2004				LIMESTONE, brown, trace cemented clay	(LS)	6	8			SPT Sampler	- <u>5</u>	
-14.0 28.5 SAND, sand, light gray, with shell, and marl (SP) 100 9 SPT Sampler 5 5 10 BORING TERMINATED AT 30 FEET ON 12/3/2004		-	1,1,						-10.5		8	14
-14.0 28.5 SAND, sand, light gray, with shell, and marl (SP) 100 9 SPT Sampler 5 5 10 BORING TERMINATED AT 30 FEET ON 12/3/2004		_≒∓	Щ		ļ	1						
-14.0 28.5 SAND, sand, light gray, with shell, and marl (SP) 100 9 SPT Sampler 5 5 10 BORING TERMINATED AT 30 FEET ON 12/3/2004			工井					}			•	
SAND, sand, light gray, with shell, and marl (SP) 100 9 SPT Sampler 5 5 10 -15.5 30.0 BORING TERMINATED AT 30 FEET ON 12/3/2004 12/3/2004 12/3/2004 12/3/2004 12/3/2004 12/3/2004 100 9 SPT Sampler 5 5 10			工工出									
SAND, sand, light gray, with shell, and marl (SP) 100 9 SPT Sampler 5 5 10 -15.5 30.0 BORING TERMINATED AT 30 FEET ON 12/3/2004 12/3/2004 12/3/2004 12/3/2004 12/3/2004 12/3/2004 100 9 SPT Sampler 5 5 10	-14 O	285						ĺ				
-15.5 30.0 BORING TERMINATED AT 30 FEET ON 12/3/2004 -15.5 5 10	- 1 4. U			SAND, sand, light gray, with shell, and	marl (SP)	100	9	ļ		SPT Sampler	5	
BORING TERMINATED AT 30 FEET ON 12/3/2004	-15.5	_{30 0}			` '				-15.5	•	5	10
12/3/2004	10.0	30.0 7:5	- 1, 6-3-1	BORING TERMINATED AT 30 FEET ON				 -	10.0			
NG FORM 1836 GIV296V38615215 SEMMINRIPRING LIGSNERVISIONS 2 3 05Vh-34 dwg 3/23/2005 10/2017 AM FST		=		12/3/2004		1		ļ				
NG FORM 1836 GIV296V38615215 SEWMINRIPRING LIGSNERVISIONS 2 3 05Vh-34 dwg 3/23/2005 10/2017 AM FST		<u> </u>										
NG FORM 1836 G1296\38615215 SEWMD\BDRING LDGS\revisions 2 3 05\h-34 dwg 3/22/2005 10:20:17 4M FST			1					1				
	NG FORM 15	R36 GN 2043 2	8615215	SEMMINE LEGS/pavisions 2 2 05/h-24.	Amo 3/33/3	2005 10:0	20,17 AM	127				

1. PROJECT FWMD STA LOCATION COO FLORIDA 3. DRILLING AGEN WILLIAMS E 4. BORING DESIGN CP05—STAS 5. NAME OF DRIL	A 5/6 EXP		SION		ON					SHEET OF 1	1 SHEET
FWMD STA LOCATION COO FLORIDA 3. DRILLING AGEN WILLIAMS E 4. BORING DESIGN CP05-STA 5. NAME OF DRIL	ORDINATES	MOISIAN								Ur	~MFL
FWMD STA LOCATION COO FLORIDA 3. DRILLING AGEN WILLIAMS E 4. BORING DESIGN CPO5-STA 5. NAME OF DRIL	ORDINATES	MOISMA		10. SI7F A	ND TYPE	OF RIT	9.	e rema	rks		JIILL
LOCATION COO FLORIDA >> 3. DRILLING AGEN WILLIAMS E 4. BORING DESIGN CPO5-STAS 5. NAME OF DRIL	NO. SEC. NO. 175 G. FET. PAISON DESIGN 10. SEC. NO. 175 G. FET. S.										
3. DRILLING AGEN WILLIAMS E 4. BORING DESIGN CPO5-STAS 5. NAME OF DRIL	x=694/02.7]		-		:		-	
WILLIAMS E 4. BORING DESIGN CPO5-STAS 5. NAME OF DRIL		/6(E),Y=	=/6266/.61(N)	1		S DESIGNA	TION OF I	DRILL			
4. BORING DESIGN CPO5-STAS 5. NAME OF DRIL		NCES						DISTURBER		· HINDISTHER	<u>n</u>
5. NAME OF DRIL	NATION			, IJ. IUIAL	JAMI'LES						
DRILLING LOG DRISSING DRIS											
DRILLING LOG BYTGEN											
DRILLING LOG											
DRILLING LOG											
DRILLING LOG											
DRILLING LOC				N/A >							
				19. SIGNATI	URE AND				logist.		
				ŀ			rf	ney, Geo	nogisi		
		LEGEND	(Description)			BOX OF SAMPLE	OR			BLOWS/ 0.5 FT-	N- VALUE
DRILLING LOG											
DRILLING LOG INSIGHT 1 1 1 1 1 1 1 1 1											
	7 = 1/.	7777	CLAYEY SAND, light brown, with limeroc	k (SC)	33	2		+12 . 5	PT Sampler		
+11.5	<u>/ 3.0 =</u> /2	4///								B	
1			with shell (LS)	ieu,					DT 0	UNF	
İ	_=	++++			25	3		Si	PT Sampler		
+8.5	6.0	++				:		+8.5		2	4
		<u> </u>	PEAT, dark brown to black, fibrous, hig	ıh	75	4			PT Sampler		
	-====	77 77	organics, medium stiff (w=459%, OC=7	9%) (PT)							5
	-===	<u> </u>	And silty clay you organic soft (,, l	50	Ę	<u>_</u>	+6.5	PT Sampler	3	
	_==	71 VI	OC=9%)	70,	30	J		21	i i sampler	2	7
	_≣∠							+4.5		- 1	J
	≓ ₁,	<u> </u>		Ī							
	<u>.</u> ⊒√	1 42 4		1							
+2.5	12.0	7 1									
	/		clay, with weathered limestone, and sh	ell							
1	_∄/		(w=22%, LL=26%, PI=10%) (LS-CL)	l	67	6		SI	PT Sampler	4	
	_=/									-3	4
] /			Ī						•	
	1	1. CORRINATE SYSTEM/DATUM DOSTURED WINDSTUNED WIN									
	/	12 MILIERTORES 12 SECIONATION OF DREEL 10 MOSTURBED 10 MOSTURBED 1 MOSTURBED									
-40	185=				[
-4.U	10.5		LIMESTONE, tan to light gray, clayey.		100	7		SF	PT Sampler	5	
			weathered, with shell (LS)						•	4	7
S. DRILLIAN SCIENT SOLENETS IN TORAL SWAPES DISTURBED UNDSTANSED											
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18, Out 17, 00/2004 11/30											
ļ	1 /		soft (w=21%, LL=27%, PI=7%) (CL)	,		-			p.u	2	4
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	=	///		ľ						ł	
					}		-			-	
-14.0	28.5		SAND medium ton to light grow (CD)		56			er	OT Sampler		
45.5			אמט, medium, tan to light gray (SP)		36	9			- i sampler		7.
-15.5	NUME OF BRILLEY 15.00 11.571 15.00 11.571 15.00 11.571 15.00 15.00 11.571 15.00										
	=		11/30/2004								
	=										
	26 CV 3047 31	9615215 5	CEMMIN ROBING DCC) navisions 2 2 05/h 25		005 15						

								Н	ole No	. CP05-		CB-003	6
	DRILL	ING LOG	DIVI	SION	INSTALLAT	ON					SHEET	1	7
-	1. PROJECT				40. 6175					·	or 3	SHEETS	ᆁ
[ΓA 5/6 EX	PANSION	DESIGN	10. SIZE 11. COORI				ee remo	Irks Sturbed	UNDISTU	- DED	4
1/2	2. LOCATION CO	ORDINATES			11. COOK	JINAIL 31	SIEM/DAI	UM	101	NAD83		VD29	1
			.92(E),Y=	=763060.81(N)	12. MANU		'S DESIGN	ATION OF	DRILL	ITADOS	110	TUZ3	1
3	3. DRILLING AGI		ENCEC		Mobile								_
<u> </u>	4. BORING DESI	EARTH SCI	ENCE2	······································	13. TOTAL	SAMPLES	3		: DISTURBE	D 18	: UNDISTURBE		1
[]		45N-CB-0	036		14. TOTAL	MUMDED	CORE BO	VEC	•	0	. ()	-
5	. NAME OF DR	ILLER	· · · · · · · · · · · · · · · · · · ·		15. ELEVA				10				-
	JOHN 5. DIRECTION OF	E UOLE	•				UND WATE	: START		.5Ft.	MPLETED		-
•	5. DIRECTION OF		INCLINED	DEC FROM VERT	16. DATE	BORING			12/9/20		12/9/2	2004	
-				DEG. FROM VERT.	17. ELEVA	TION TOP	OF BORIN			+15.5 F	<u></u>	·····	1
	7. THICKNESS C			N/A Ft.	18. TOTAL	CORE RE	COVERY F	OR BORIN	G		····	N/A %	3
-	3. DEPTH DRILL		·····	36.5 Ft.	19. SIGNA	TURE AND	TITLE OF						1
19). TOTAL DEPTH	OF HOLE		75.0 Ft.			1	J. Lan	gley, Ge	ologist			1
	ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)		%	용발	RQD		REMARKS	YS/ FT-	" UE	ł
. 1			TEGE	(Description)		REC	BOX OR SAMPLE	OR UD		REMARNS	BLOWS/ 0.5 FT-	N- VALUE	0.0
	+15.5	0.0	10.700 A	SAND, fine, brown to tan, silty, slightly	clayey,	75		<u> </u>		SPT Sampler	12		E "."
				with weathered limestone fragments (SF	')						17	29	E
L	+13.5	2.0	12.22	AND AND AND AND AND AND AND AND AND AND					+13.5		8		.ŧ
	7	7 ∄		SANDY CLAY, brown, silty, trace shell, weathered limestone tragments (CL)	rith	33	2			SPT Sampler	3	_	2.5
	+11.5	† <u>, </u>		woulded innesione tragilians (az)								5	Ė
-	T11.3	4.0	<u> </u>	PEAT, dark brown, silty, with shell and	wood	50	3	ļ —	+11.5	SPT Sampler	2		·Ē
į		│ <i>-</i> ⊉	11/11/	pieces, very soft (w=32%, OC=6%) (PT)							2	<u>=</u> 5.0
l		<u> </u>	<u> </u>						+9.5		2	-	F
	+8.5	70 🖹	<u> </u>			33	4			SPT Sampler			F
_		T =		LIMESTONE, light gray, caprock, weather	ed (LS)				+8.4		2 50/5"	>50	7.5
- 1		│				İ	Ì						E
•						3	,5	, -	+6.7	SPT-Sampler	50/3"		·È
1	•												10.0
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		1 =											Ē
		=											Ē
													- 12.5 -
				And clavey sand		50				CDT Campalor			E
				And clayey sand		50	6		•	SPT Sampler	3	_	E
l		=					-		+0.5		5	7	_15.0
		=											E
ł													Ė
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1/26/05		-		(w=25%, LL=29%, PI=3%)		100	7		5	SPT Sampler	2		F
7									-4.5		5	8	20.0
ē		#											F
1836.601		=											E
ACE		=	++-								İ		E
2			! ! !					ŀ			ŀ		22.5 -
5&t6.0		=		(-200=12.5%, w=18%)		67	8]		SPT Sampler			E
STS		===				07	٥			ori Sumpler .			E
₹ ¥				With shell					-9.5		6	14	25.0
152											ľ		Ė
38615215 11/3/03 SFWMD ST5&6.GPJ		‡											E
=1		=									ĺ		27.5
ائن ≤		28.5									ľ		Ē
28				SILTY SAND, fine, gray, slightly clayey (S	M)	83	9		S	PT Sampler	2		E
JOB NUN CORP LOGS		<u>=</u>						-	-14.5	-	-1	3	30.0
URS ARMY C										(Cont.	inued)		<u> </u>
⊃ * [EN	G FORM 18	36 G:\296\	38615215 .5	FWMD\BORING LOGS\revisions 2_3_05\b-36a.c	Jwo 3/23	/2005 10	0:21:56 AM	FST		(30///			j

DDII I IM	G LOG (Cont Sh	n o t)	INSTALLATION			ELEVATION	Hole TOP OF HO	No.	CP05-	STA5N-(CB-003 2	-6 7
			ION DESIGN		LCOOPDINATE.	CVCTEL	15.5				OF 3	SHEET	s
LOCATION COOR			ION DESIGN . X=694707.92(E),Y=7630)60 R1(N)	COORDINATE	2121FW	/DATUM		HUI	RIZONTAL NAD83	VERTICAL NG\	/D29	ı
ELEVATION	DEPTH	LEGEND	CLASSIFICATIO	ON OF MATERIALS cription)		% REC	BOX OR SAMPLE	RQD OR UD	•• ,	REMARKS	BLOWS/ 0.5 FT-	N- VALUE	1
			SILTY SAND, fine, gray, (continued)	slightly clayey				35			2		+
	-												
-						83	10			PT Sampler	2 4	_	
			Some cemented sand		t			-19	1.5		3	7	-
,			Some contented sund	•	•								ŀ
						100	11		SF	PT Sampler	2 3		F
					-	·		-24	.5		6	9	-
										,			F
-28.0	43.5												
20.0			SAND, medium to coars slight sulfur—like smell	se, gray, with sh	nell,	67	12	,	SP	T Sampler	8 10		
				· · ·	-			-29	.5		10	20	ŀ
													E
77.0	48.5												
-33.0	40.0	4	LIMESTONE AND SAND, r gray, weathered limesto	medium to coars	se,	67	13		SP	T Sampler	9		E
		出	sulfur-like smell (LS-Si	P)				-34	.5		12	26	Ė
		井川											E
70.0		井川											E
-38.0	53.5		LIMESTONE, gray, sandy calcareous, with shell, s	weathered,	(15)	83	14		SP	T Sampler	23		E
				Saudi ANG 2111611	(12)	_		-39	5	-	<u>14</u>	30	E
		<u> </u>											E
	1	1 1 1											
	=					67	15		SP	T Sampler	15		E
	-				-			-44.	5		<u>21</u> 22	43	E
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	_					67	16		SPT	Sampler _	12		E
	=				-			-49.	5		11	23	
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	1												Ę
-53.0	68.5								· - ·				F
NG FORM 183	36-A G		15 SFWMD\BORING LOGS\re							(Conti	nued)		

		-		T			51 5141 7101	Ho I TOP OF I	le N	o. CP05-	STA5N-C	
	LOG (Co	ont She	eet)	INSTALLATION			15.5	1 104 04 1	TULE		of 3	3 Sheets
	MD STA 5/6				COORDINATE	SYSTEM	\DATUM		:	HORIZONTAL	VERTICAL	000
LOCATION COORD			X=694707.92(E),Y=7630 CLASSIFICATIO	060.81(N). On of Materials	<u> </u>		oz ıni	RQD	<u></u>	NAD83	NGV	
ELEVATION	DEPTH	LEGEND		scription)		% REC	BOX OR SAMPLE	OR UD		REMARKS	BLOWS/ 0.5 FT-	N- VALUE
			SAND, medium to fine,	aray, trace sh	ell	100	17	00		SPT Sampler	15	
			(continued) (SP)	, 3 , - 1 ,				-	54.5		21 31	52
												1
												1
							:					
	1					100	18			SPT Sampler	<u>23</u>	84
-59.5	75.0 📑 :	4-1-4-4	BORING TERMINATED AT	75 FFFT ON					59.5		45	
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South Florida Water Management District Contract CN040936-W005, STA-5 Flow-way 3 Basis of Design Report

APPENDIX B

FIELD PERMEABILITY DATA

URS

SFWMD

STA 5 EXPANSION PROJECT

In- situ Constant Head Permeability Tests

		C1-1	C1-2	C1-3	C2-1	C2-2	C2-3
Test interval	Ħ	35-45	20-30	5-15	5-15	35-45	20-30
0 T = 1	S # # #	0.00011 0.29 10 3.5	0.00006 0.29 10 3	0.00056 0.29 10 3	0.00009 0.29 10 0.8	0.00006 0.29 10 1.5	0.00007 0.29 10 1.5
/r= Cs=		34.28571429 60	34.28571429 60	34.28571429 60	34.28571429 60	34.28571429 60	34.28571429 60
<u>*</u>	ft/sec	1.7E-06	1.1E-06	1.0E-05	6.0E-06	2.1E-06	2.5E-06
Subsoil within testing section		Sand, silty, clayey	Lstone	Lstone clay sand	Lstone sandy clay Istone sand	silty and clayey sand Lstone fragments	silty and clayey sand Lstone fragments

South Florida Water Management District Contract CN040936-W005, STA-5 Flow-way 3 Basis of Design Report

APPENDIX C

LABAROTARY DATA

URS



1900 N.W. 40 th Ct.

Pompano Beach,FL. 33064-8718 954-972-7570 Fax: 954-972-6608

MOISTURE - DENSITY RELATIONSHIP

Project Name:

STA 5-WORK AREA C

Client:

URS

Project Number:

F304034

Contract Number:

Proctor Number: S-3 4

S-3 43+50

Sample Identification:

Description:

D.Brown fine sand with some limerock

Location:

Date Sampled:

01/26/05

Source:

EXCV.

Material No. :

Passing #4:

<u>79.9%</u>

Compaction Method:

Mechanical

Standard Proctor:

Modified Proctor:

T-180

Results:

Max. Dry Density: Optimum Water %:

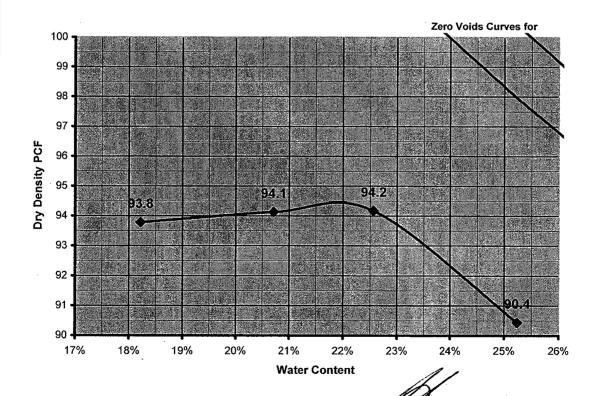
94.5 PCF 22 %

Date Tested: Technician:

02/12/05 AU

Job Specification:

100%



Copies to:

Engineer:

Bensa Nukunya, PhD, PE

Senior Geotechnical/Materials Engineer

Florida Registration No. 59440

1) 2)



1900 N.W. 40 th Ct. Pompano Beach,FL. 33064-8718

954-972-7570 Fax: 954-972-6608

PROCTOR SUMMARY

PROJECT No.: F304034

CLIENT: URS PROJECT NAME: STA 5-WORK AREA C

OPTIMUM MOISTURE	22
MAX DENSITY PCF	94.5
SOIL CLASSIFICATION	A-3 (NP)
PROGITOR NUMBER (MOD.)	1/26/2005 S-3 43+50
DATE	1/26/2005

#200	9.2%		
#100	21.2%		
#80 E	37.5%		
issing) ************************************	58.1%		
(Percent Passing	%6'92		
Sieve Analysis (%6'62		
Sie 3/8": ≅	83.4%		
1/2"	85.1%		
3/4"	91.3%		
1000	100.0%		
mple ID	43+50		
	?		



1900 N.W. 40 th Ct.

Pompano Beach,FL. 33064-8718 954-972-7570 Fax: 954-972-6608

MOISTURE - DENSITY RELATIONSHIP

Project Name:

STA 5-WORK AREA C

Client:

URS

Project Number:

F304034

Contract Number:

Proctor Number: S3 +3

S3 +316

Sample Identification:

Description:

D.Brown fine sand with I. limerock & organic mat.

Location:

Date Sampled:

01/26/05

Source:

EXCV.

Material No.:

Passing #4:

<u>73.7%</u>

Compaction Method:

Mechanical

Standard Proctor:

Modified Proctor:

T-180

Results:

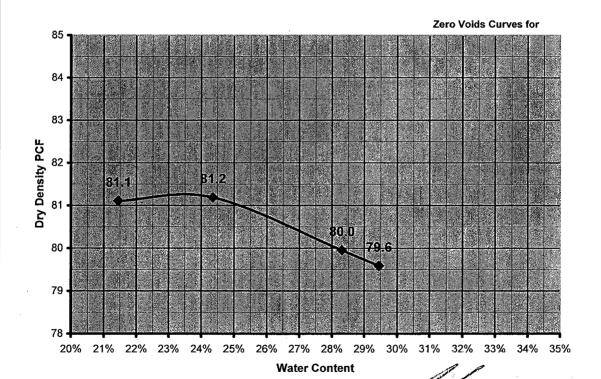
Max. Dry Density: Optimum Water %:

81.3 PCF 23.5 % Date Tested: Technician:

02/12/05 AU

Job Specification:

100%



Copies to:

Engineer:

Bensa Nukunya, PhD, PE

Senior Geotèchnical/Materials Engineer

Florida Registration No. 59440

1)

2)



1900 N.W. 40 th Ct. Pompano Beach, FL. 33064-8718 954-972-7570 Fax: 954-972-6608

PROCTOR SUMMARY

PROJECT No.: F304034

CLIENT: URS PROJECT NAME: STA 5-WORK AREA C

OPTIMUM MOISTURE	24
MAX DENSITY PGF	81.3
SOIL CLASSIFICATION	
PROCTOR NUMBER (MOD.)	S3 +316
DATE	1/26/2005

	#200	8.5%		
	#100	13.6%		
	09#	%2'67		
ssing)	+ + #40	51.1%		
(Percent Passing	#10	%6.69		
Sieve Analysis (Perce	#4	73.7%		
Sie	3/8"	%9'52		
	1/2"	76.5%		
	3/4"	%L'LL		
	4.1	100.0%		
Sample ID	Callibication	S3 +316		



1900 N.W. 40 th Ct.

Pompano Beach, FL. 33064-8718 954-972-7570 Fax: 954-972-6608

MOISTURE - DENSITY RELATIONSHIP

Project Name:

STA 5-WORK AREA C

Client:

URS

Project Number:

F304034

Contract Number: Proctor Number:

S-3 +450

Sample Identification:

Description:

D.Brown fine sand with I. limerock

Location:

Date Sampled:

Source:

01/26/05 EXCV.

Material No.:

Passing #4:

99.4%

Compaction Method:

Mechanical

Standard Proctor:

Modified Proctor:

T-180

Resuits:

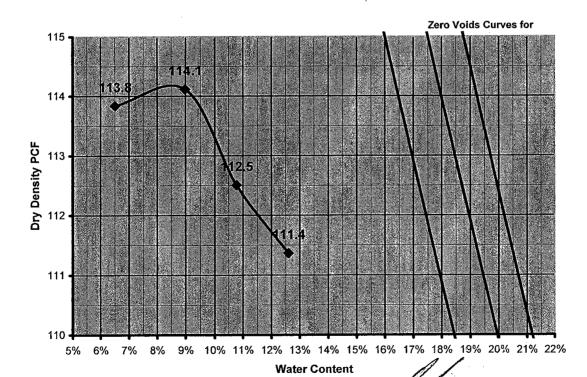
Max. Dry Density: **Optimum Water %:** 114.3 PCF

8.5 %

Date Tested: Technician: 02/12/05 AU

Job Specification:

100%



Copies to:

Engineer:

Bensa Nukunya, PhD, PE

Senior Geotechnical/Materials Engineer

Florida Registration No. 59440

1) 2)



1900 N.W. 40 th Ct. Pompano Beach, FL. 33064-8718 954-972-7570 Fax: 954-972-6608

PROCTOR SUMMARY

PROJECT No.: F304034

CLIENT: URS PROJECT NAME: STA 5-WORK AREA C

STURE %	თ
MOI	
DENSITY PCF	114.3
SOIL CLASSIFICATION	A-3 (NP)
NUMBER (MOD.)	1/26/2005 S-3 +450
DATE	s/2005 S
	72

#200	4.4%		
001/#	6.8%		
09#	20.7%		
ssing) #40	64.8%		
Percent Pa	%0.66		
ve Analysis #4	%1.66		
Sieve, 3/8" =	100.0%		
1/2"	100.0%		
3/4"	100.0%		
1	100.0%		
Sample ID	S-3 +450		



1900 N.W. 40 th Ct.

Pompano Beach,FL. 33064-8718 . 954-972-7570 Fax: 954-972-6608

MOISTURE - DENSITY RELATIONSHIP

Project Name:

STA 5-WORK AREA C

Client:

URS

Project Number:

F304034

Contract Number:

1.204024

Proctor Number:

S-5 +2050

Sample Identification:

Description:

D.Brown fine sand with little limerock & organics

Location:

Date Sampled:

01/27/05

Source:

Material No. :

Passing #4:
Compaction Method:

Mechanical

Standard Proctor:

Modified Proctor:

T-180

Results:

Max. Dry Density: Optimum Water %:

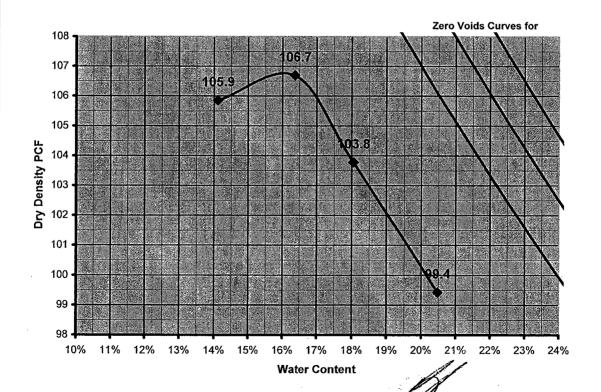
106.8 PCF 16 %

Date Tested: Technician:

02/12/05 AU

Job Specification:

100%



Copies to:

Engineer:

Bensa Nukunya, PhD, PE

Senior Geotechnical/Materials Engineer

Florida Registration No. 59440

1)

2)



WILLIAMS EARTH SCIENCES, INC 1900 N.W. 40 th Ct. Pompano Beach, FL. 33064-8718 954-972-7570 Fax: 954-972-6608

PROCTOR SUMMARY

PROJECT No.: F304034

CLIENT: URS PROJECT NAME: STA 5-WORK AREA C

MATERIAL	%0	
SOURCE	0	
DENSITY PSPEC.	100%	
OPTIMUM MOISTURE	16	
MAX DENSITY PCF	107	
SOIL CLASSIFICATION	A-3 (NP)	
PROCTOR NUMBER (MOD.)	1/27/2005 S-5 +2050	
DATE	1/27/2005	

Sample ID A1" Sleve Analysis (Percent Passing) S-5 +2050 100.0% 98.5% 98.0% 97.0% 96.0% 51.0% 27.2% 13.6% 6.8%			_	
Sieve Analysis (Percent Passing) 100.0% 100.0% 98.5% 98.0% 97.0% 96.0% 51.0% 27.2%	#200	%8.9		
Sieve Analysis (Percent Passing) 100.0% 100.0% 98.5% 98.0% 97.0% 96.0% 51.0%	#100	13.6%		
Sieve Analysis (Percent Passin 100.0% 100.0% 98.5% 98.0% 97.0% 96.0%	09#	27.2%		
Sieve Analysis (P	assing) #40	51.0%		
Steve 100.0% 100.0% 98.5% 98.0%	(Percent P.	%0.96		
100.0% 100.0% 98.5%	eve Analysis - #4	%0'.26		
100.0% 100.0%	SI 3/8 ¹²	98.0%		
100.0%	712"	98.5%		
100	3/4"	100.0%		
Sample ID S-5 +2050	11 P	100.0%		
S.a.	mpletID	+2050		
	Sa	S-5		



1900 N.W. 40 th Ct.,

Pompano Beach,FL. 33064-8718 954-972-7570 Fax: 954-972-6608

MOISTURE - DENSITY RELATIONSHIP

Project Name:

STA 5-WORK AREA C

Client:

URS

Project Number:

F304034

Contract Number:

Proctor Number:

S7 +450

Sample Identification:

Description:

D.Brown fine sand with little limerock & organics

Location:

Date Sampled:

01/27/05

Source: Material No. : Passing #4:

Compaction Method:

Mechanical

Standard Proctor:

Modified Proctor:

T-180

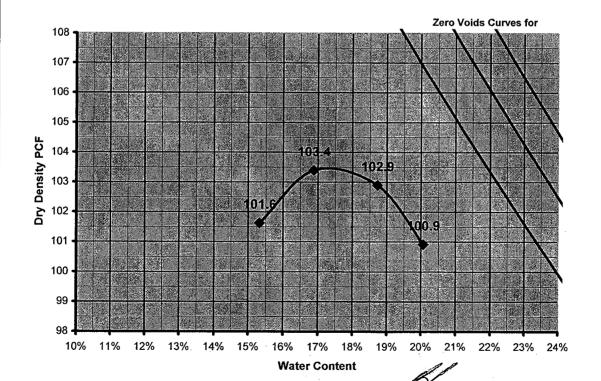
Results:

Max. Dry Density: Optimum Water %:

103.5 PCF 17.5 % Date Tested: Technician:

02/12/05 AU

Job Specification:



Copies to:

Engineer:

Bensa Nukunya, PhD, PE

Senior Geotechnical/Materials Engineer

Florida Registration No. 59440

1)

2)



WILLIAMS EARTH SCIENCES, INC 1900 N.W. 40 th Ct. Pompano Beach,FL. 33064-8718 954-972-7570 Fax: 954-972-6608

PROCTOR SUMMARY

PROJECT No.: F304034

CLIENT: URS PROJECT NAME: STA 5-WORK AREA C

MATERIAL NO.	%0
SOURCE	0
% DENSITY SPEC.	100%
OPTIMUM MOISTURE	18
MAX DENSITY PGF	104
SOILCLASSIFICATION	A-3 (NP)
PROCTOR NUMBER (MOD.)	S7 +450
DATE	1/27/2005 S7 +450

		 _	
#200	18.0%		
#100	25.9%		
#60	44.2%		,
issing) #40	70.5%		
(Percent Pa #10	87.2%		
eve Analysis (Percent Passing)	88.8%		
3/8" Si	92.0%		
412"	92.7%		
3/4"	94.1%		
Seather the	100.0%		
Sample ID	S7 +450		

South Florida Water Management District Contract CN040936-W005, STA-5 Flow-way 3 Basis of Design Report

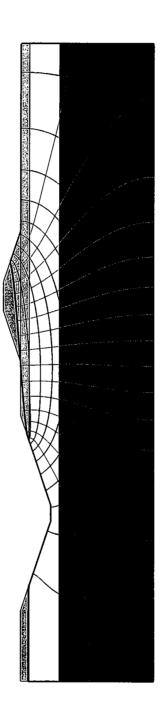
APPENDIX D

SEEPAGE ANALYSES

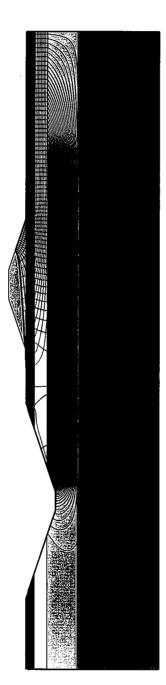


SFWMD STA 5 EXPANSION - BORING CB-12

Total Flowrate = 1.4796(ft^3/d)/(ft)



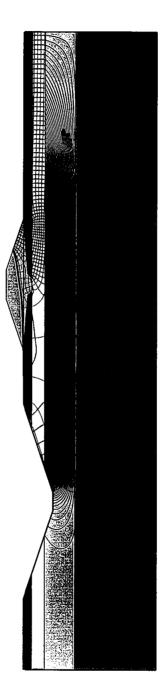
Materials
FILL (Kh=0.4fbday)
SAND (Kh=0.6fbday)
LIMESTONE (Kh=0.86fbday)
CLAYEY SAND (Kh=0.15fbday)



SFWMD STA 5 EXPANSION - BORING CB-28 Total Flowrate = 5.0866(ft^3/d)/(ft)

Materials
FILL (Kh=0.4ft/day)
COMPACTED MUCK (Kh=0.1ft/day)
INSITU MUCK (Kh=26ft/day)

LIMESTONE AND SAND (Kh=0.52ft/day)
SAND (Kh=5ft/day)
CLAYEY SAND (Kh=0.22ft/day)

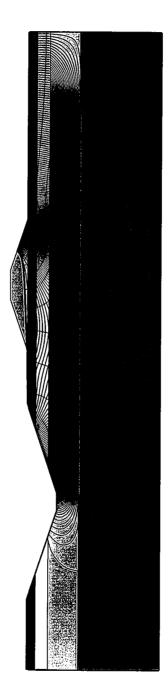


SFWMD STA 5 EXPANSION - BORING CB-28 Total Flowrate = 7.5297(ft^3/d)/(ft)

INSITU MUCK (Kh=26ft/day) LIMESTONE AND SAND (Kh=0.52ft/day) Materials <u>表示</u> FILL (Kh=0.4ft/day) COMPACTED MUCK (Kh=1.6ft/day)

SAND (Kh=5ft/day)

CLAYEY SAND (Kh=0.22ft/day)



SFWMD STA 5 EXPANSION - BORING CB-28 Total Flowrate = 10.6309(ft/3/d)/(ft)

,

Materials

FILL (Kh=0.4fVday)

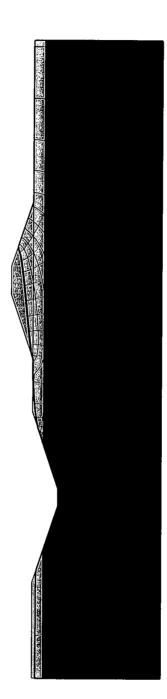
COMPACTED MUCK (Kh=1.6fVday)

INSITU MUCK (Kh=26fVday)

LIMESTONE AND SAND (Kh=0.52fVday)

SAND (Kh=5fVday)

CLAYEY SAND (Kh=0.22fVday)



SFWMD STA 5 EXPANSION - BORING CB-33
Total Flowrate = 2.0612(ft^3/d)/(ft)

Materials FILL (Kn=0.4ft/day) SAND (Kn=0.6ft/day) CLAYEY SAND (Kn=0.2ft/day)

,...,Ř

South Florida Water Management District Contract CN040936-W005, STA-5 Flow-way 3 Basis of Design Report

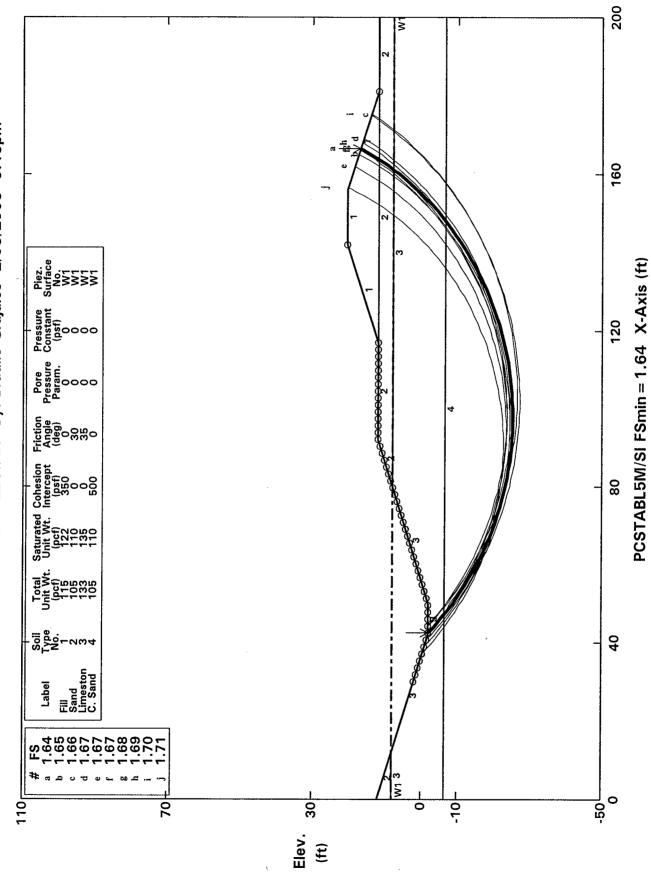
APPENDIX E

SLOPE STABILITY ANALYSES

URS

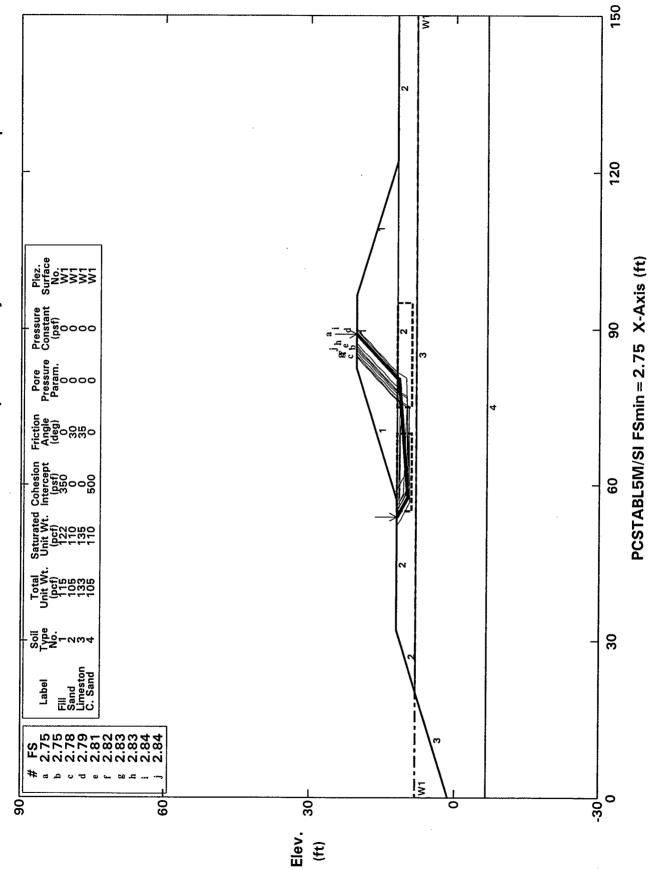
SFWMD STA E KPANSION CB-12 E.O.C.

Ten Most Critical. C:CB-12EC.PLT By: Braulio Grajales 2/03/2005 5:45pm



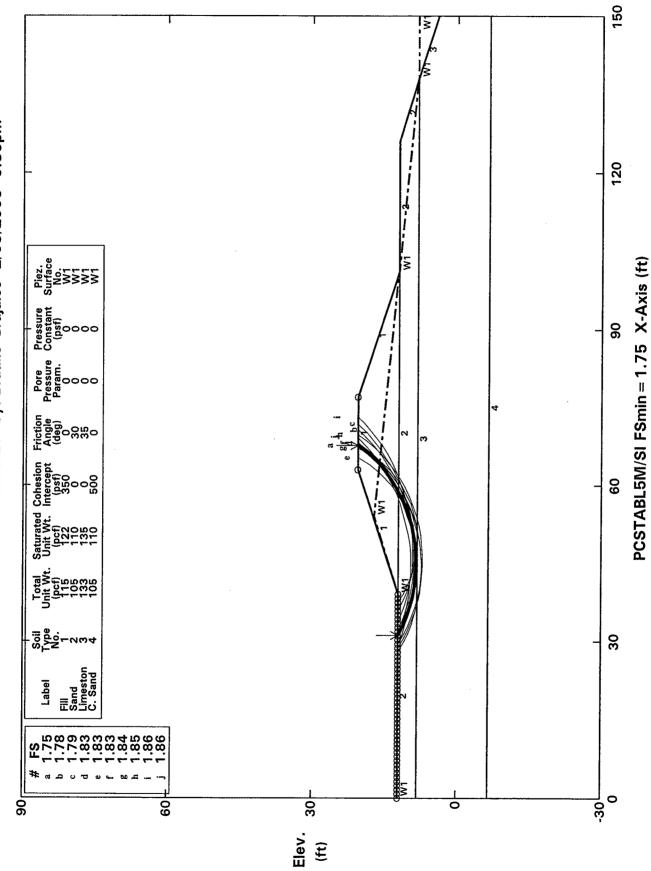
SFWMD STA E (PANSION CB-12 E.O.C.

Ten Most Critical. C:CB-12ECW.PLT By: Braulio Grajales 2/03/2005 5:45pm



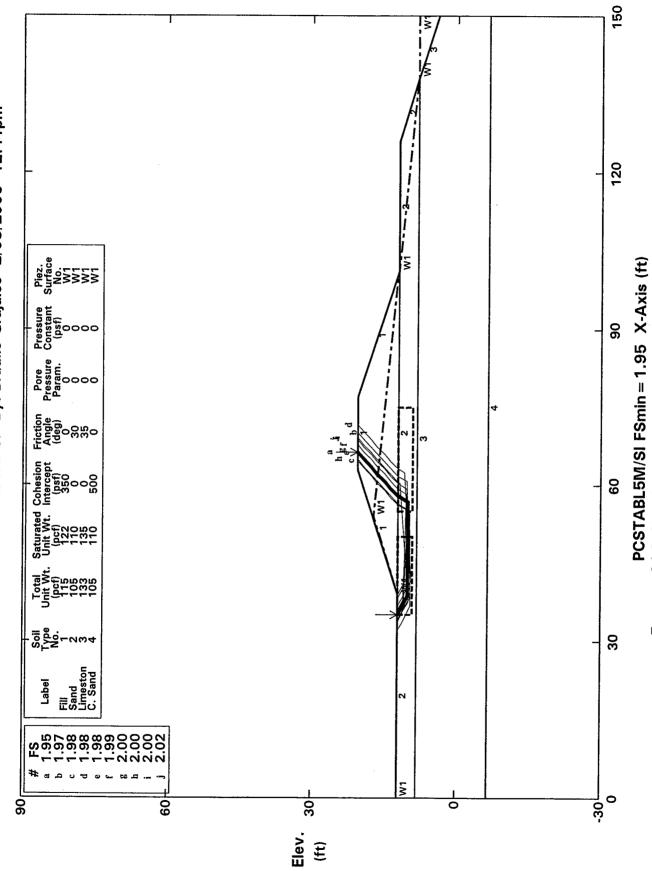
SFWIND STA :XPANSION CB-12 R.D.

Ten Most Critical. C:CB-12RD.PLT By: Braulio Grajales 2/03/2005 6:35pm



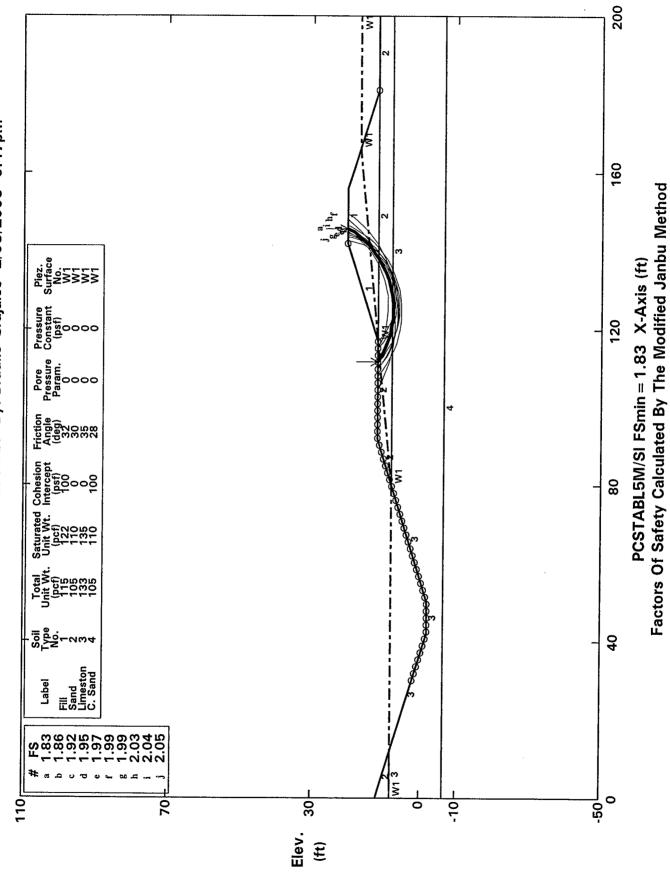
SFWMD STA XXPANSION CB-12 R.D.

Ten Most Critical. C:CB-12RDW.PLT By: Braulio Grajales 2/08/2005 12:41pm



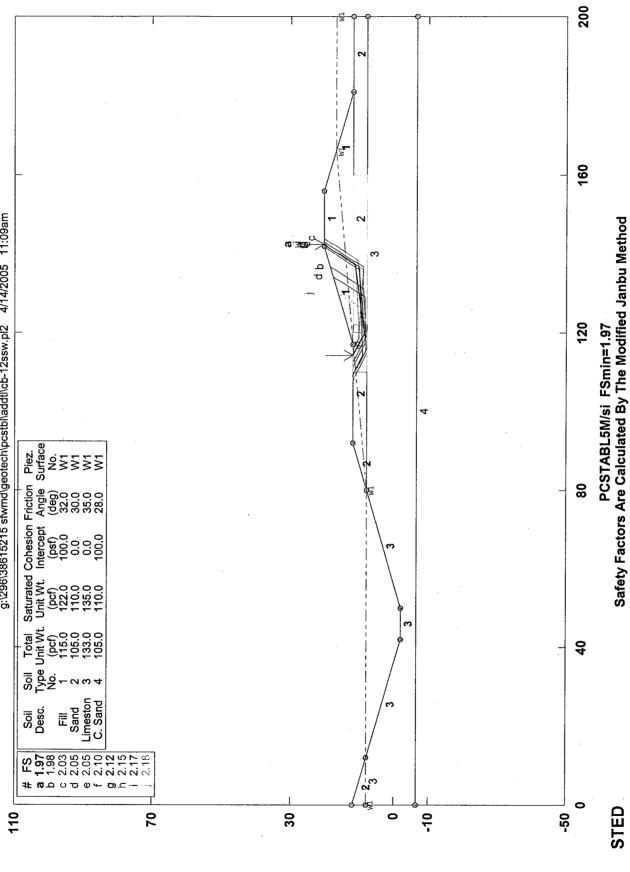
SFWMD STA _ :XPANSION CB-12 S.S.

Ten Most Critical. C:CB-12SS.PLT By: Braulio Grajales 2/03/2005 5:47pm



SFWMD STA 5 EXPANSION CB-12 S.S.

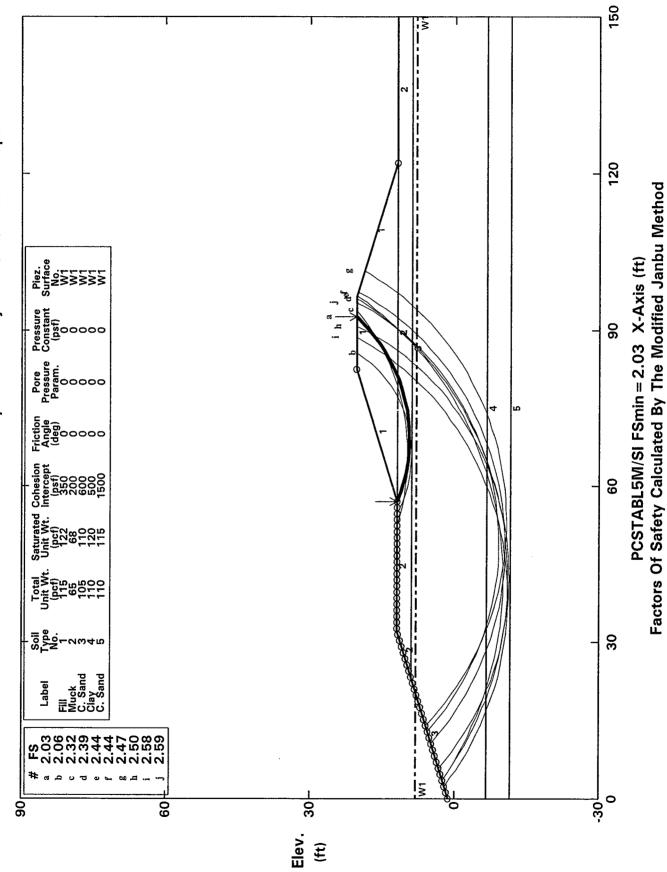
g:\296\38615215 sfwmd\geotech\pcstb\\addt\\cb-12ssw.pl2 4/14/2005 11:09am





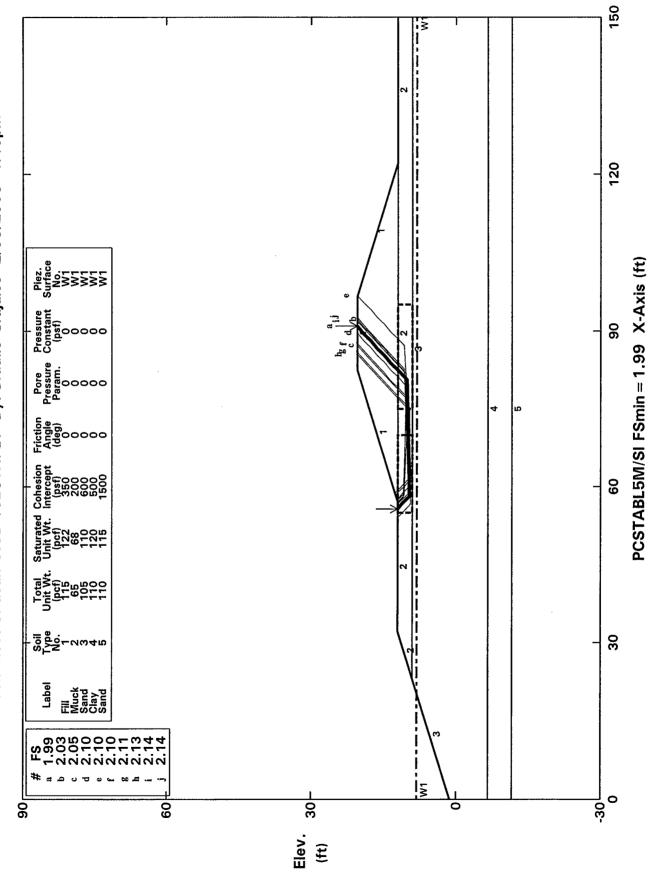
SFWMD STA 5 (PANSION CB-16 E.O.C.

Ten Most Critical. C:CB-16EC.PLT By: Braulio Grajales 2/03/2005 4:43pm



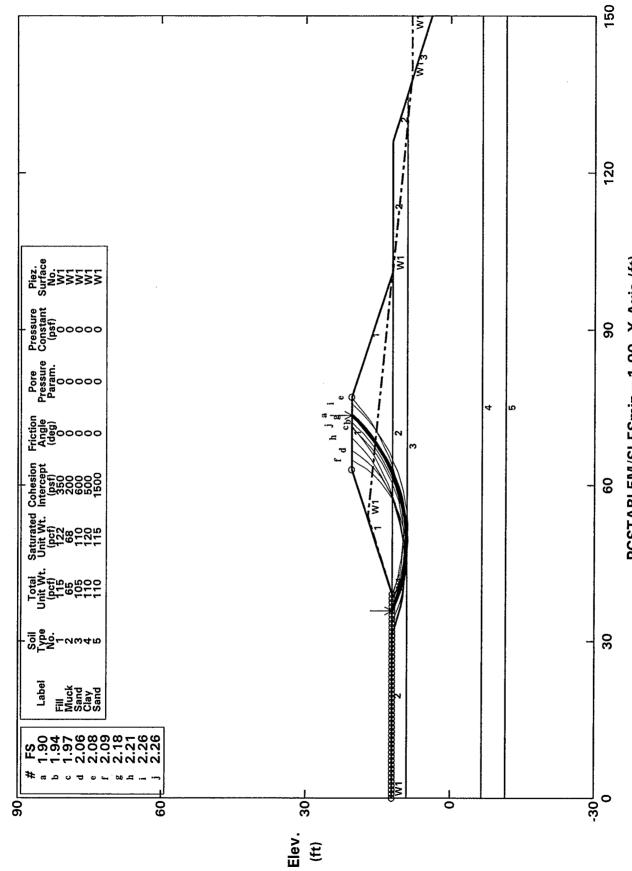
SFWMD STA 5 _ KPANSION CB-16 E.O.C.

Ten Most Critical. C:CB-16ECW.PLT By: Braulio Grajales 2/03/2005 4:46pm



SFWMD STA _ XPANSION CB-16 R.D.

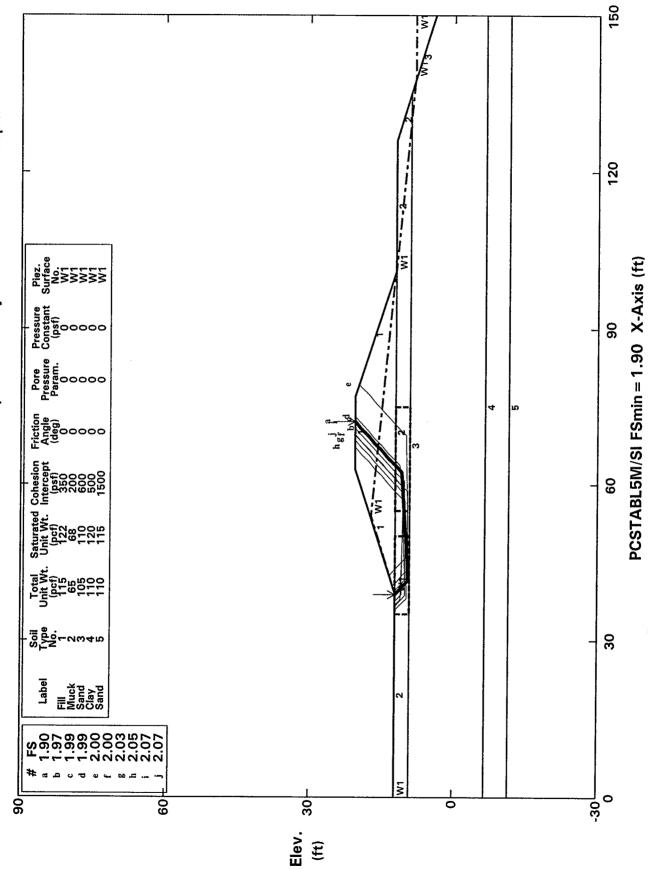
Ten Most Critical. C:CB-16RD.PLT By: Braulio Grajales 2/03/2005 6:39pm



PCSTABL5M/SI FSmin = 1.90 X-Axis (ft)
Factors Of Safety Calculated By The Modified Janbu Method

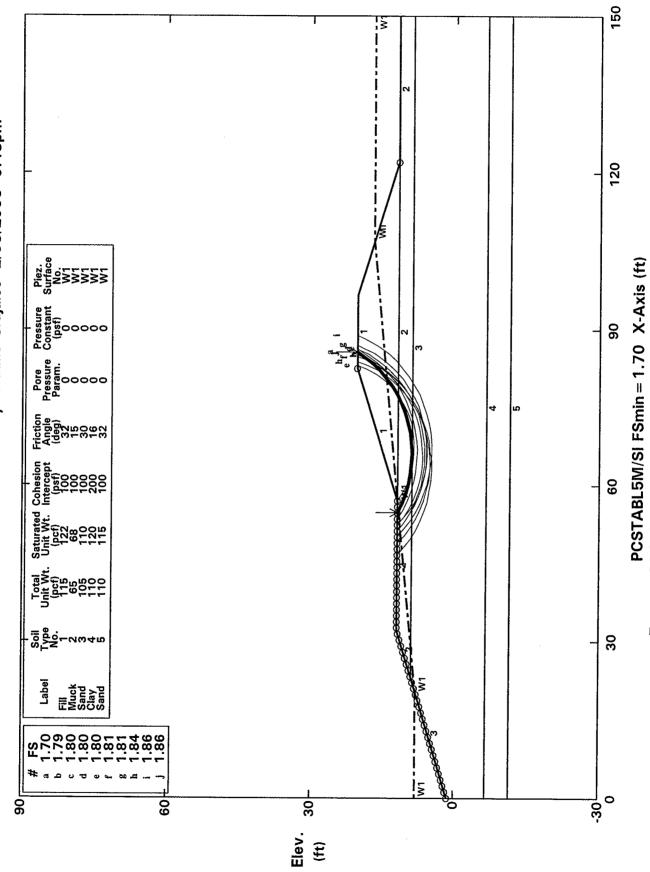
SFWMD STA XXPANSION CB-16 R.D.

Ten Most Critical. C:CB-16RDW.PLT By: Braulio Grajales 2/03/2005 6:39pm



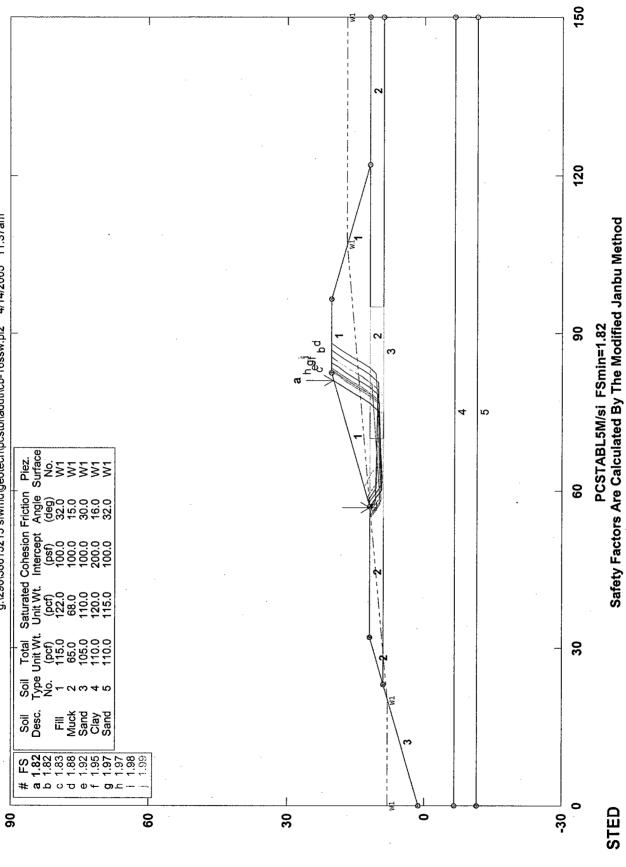
SFWMD STA :XPANSION CB-16 S.S

Ten Most Critical. C:CB-16SS.PLT By: Braulio Grajales 2/03/2005 5:43pm



SFWMD STA 5 EXPANSION CB-16 S.S

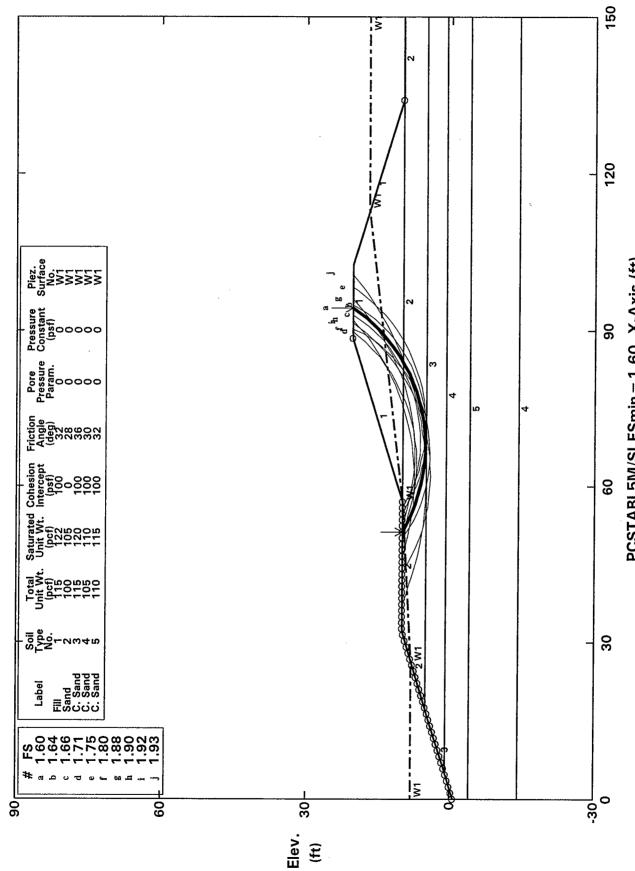
g:\296\38615215 sfwmd\geotech\pcstb\\addt\\cb-16ssw.pi2 4/14/2005 11:37am





SFWIND STA _XPANSION CB-33 S.S.

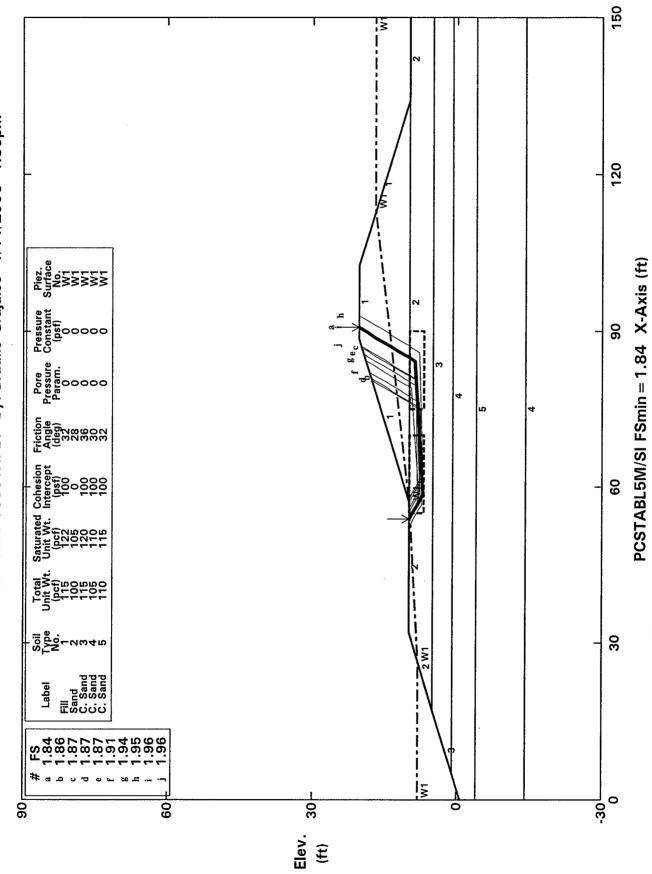
Ten Most Critical. C:CB-33SS.PLT By: Braulio Grajales 4/14/2005 4:35pm



PCSTABL5M/SI FSmin = 1.60 X-Axis (ft)
Factors Of Safety Calculated By The Modified Janbu Method

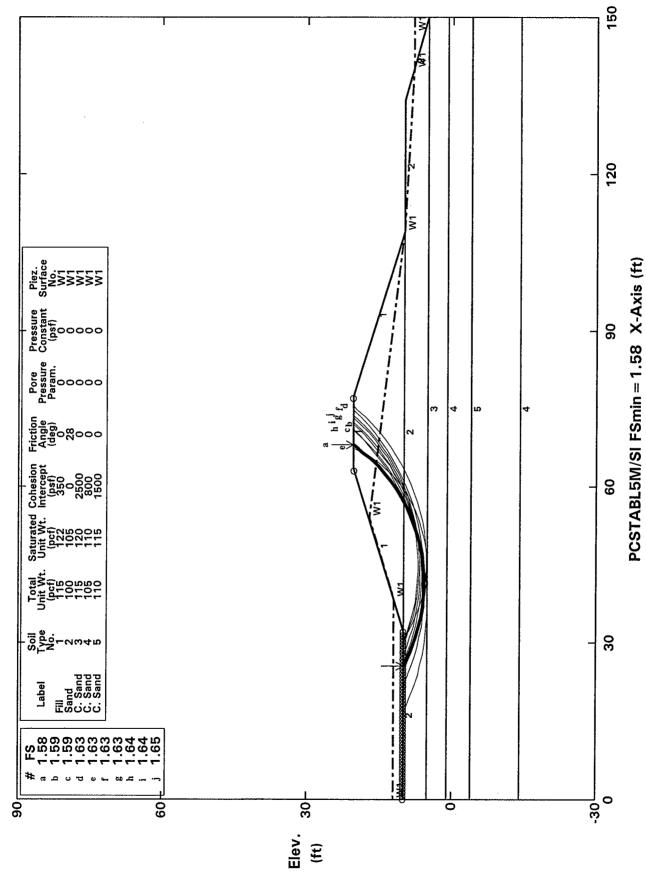
SFWMD STA . XPANSION CB-33 S.S.

Ten Most Critical. C:CB-33SSW.PLT By: Braulio Grajales 4/14/2005 4:35pm



SFWIND STA . XPANSION CB-33 R.D.

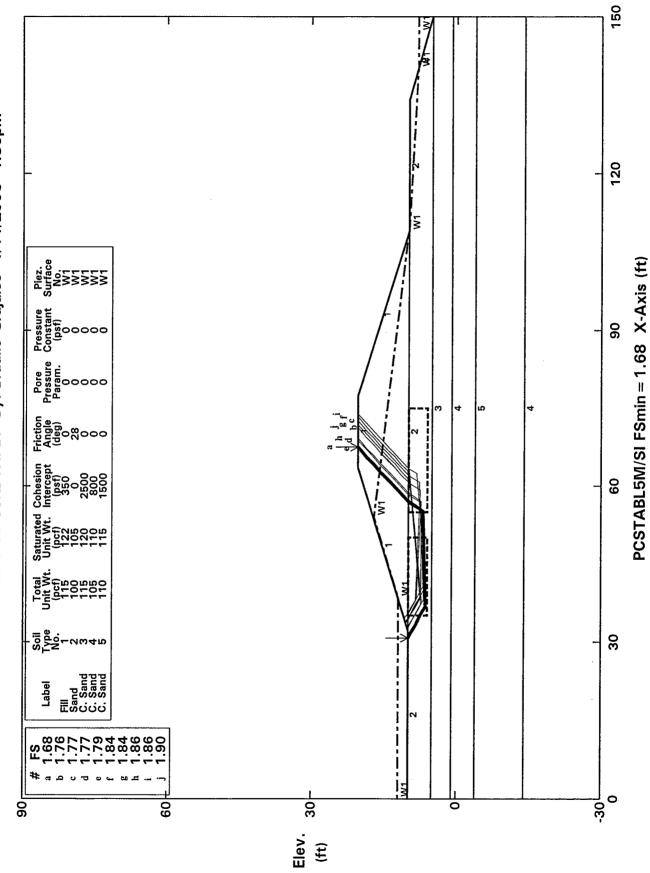
Ten Most Critical. C:CB-33RD.PLT By: Braulio Grajales 4/14/2005 4:36pm



FCS I ABL SIMI/SI FSMIN = 1.58 X-AXIS (ft)
Factors Of Safety Calculated By The Modified Janbu Method

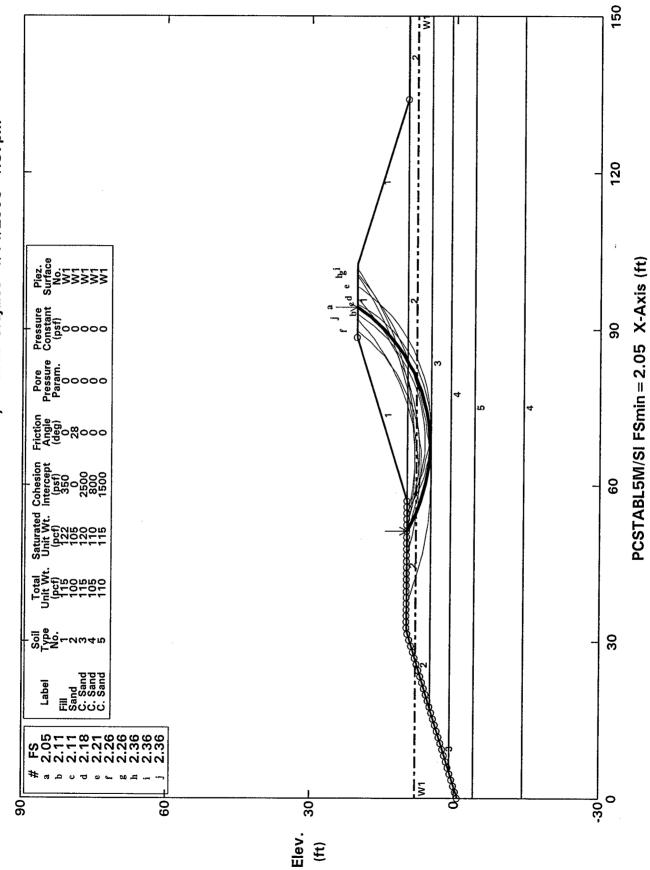
SFWIND STA X XPANSION CB-33 R.D.

Ten Most Critical. C:CB-33RDW.PLT By: Braulio Grajales 4/14/2005 4:36pm



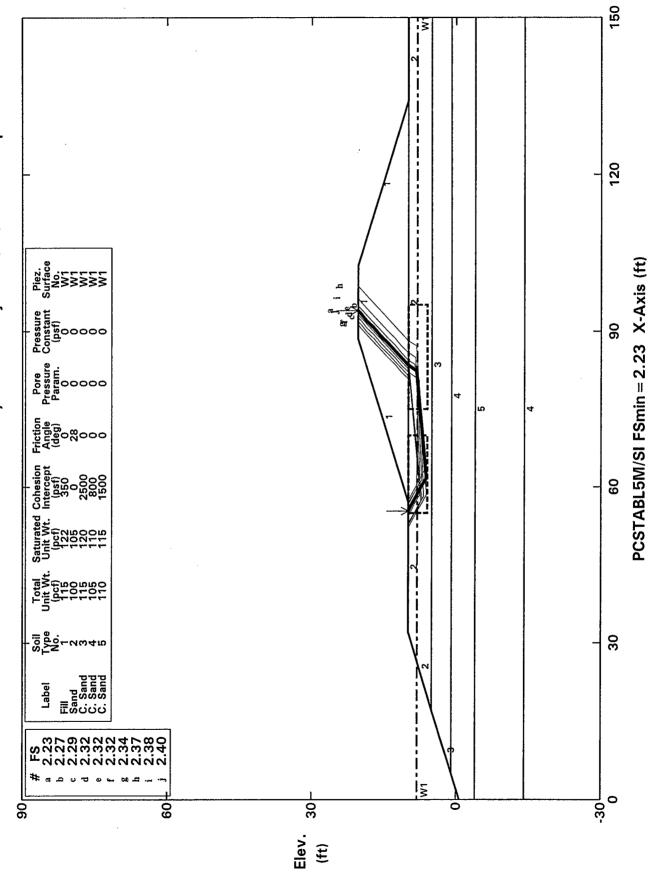
SFWIND STA E (PANSION CB-33 E.O.C.

Ten Most Critical. C:CB-33EC.PLT By: Braulio Grajales 4/14/2005 4:37pm



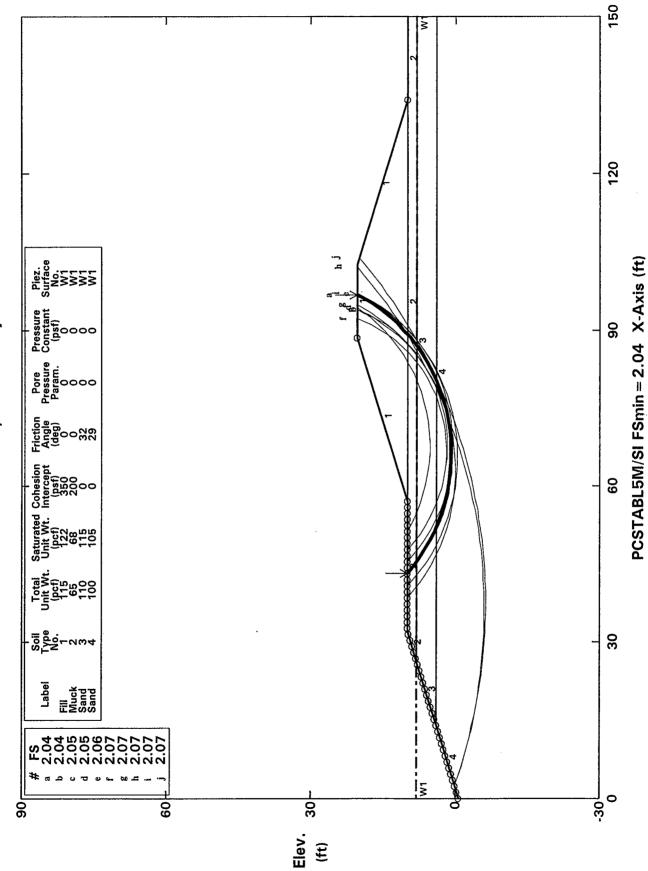
SFWMD STA 5 (PANSION CB-33 E.O.C.

Ten Most Critical. C:CB-33ECW.PLT By: Braulio Grajales 4/14/2005 4:37pm



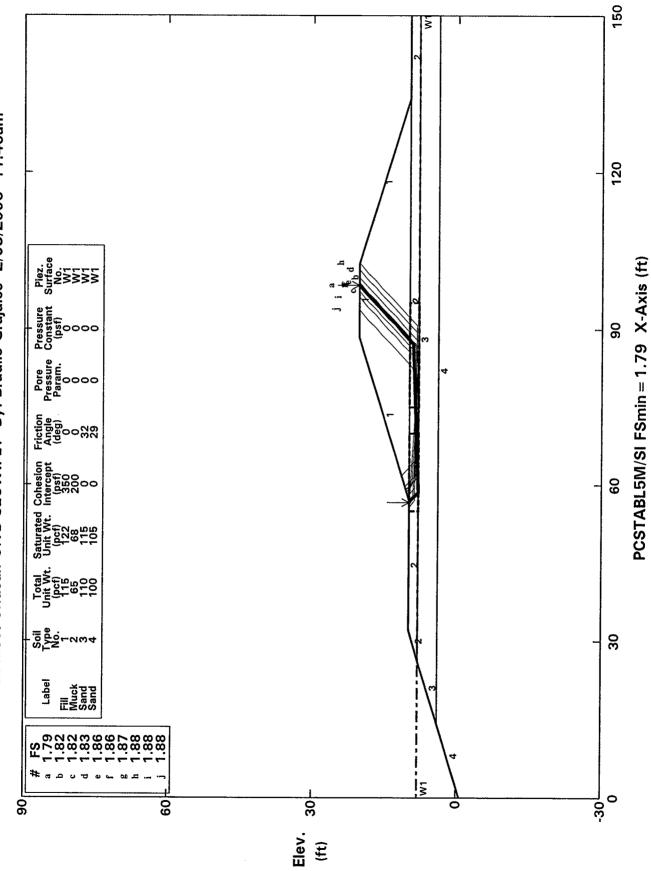
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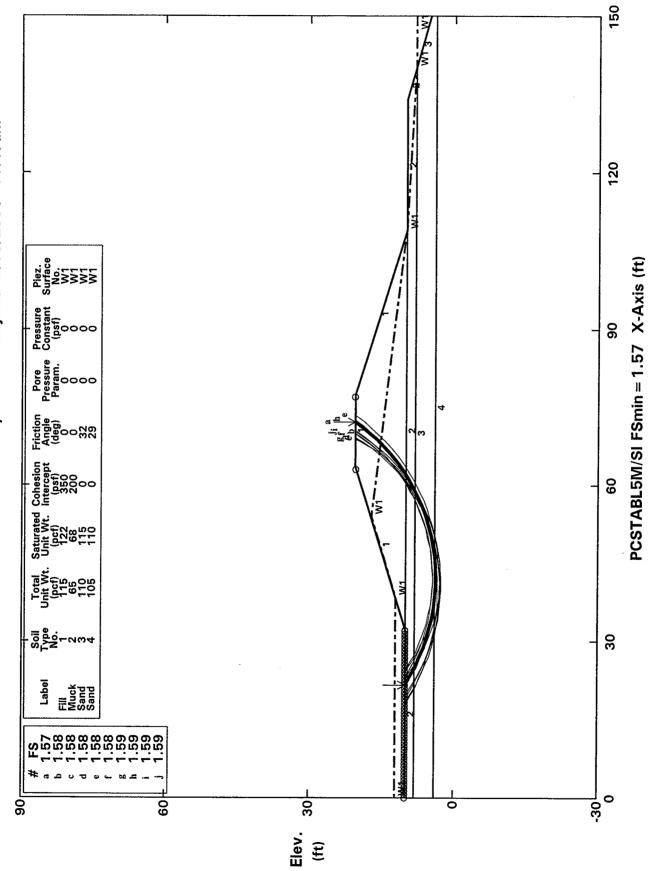
SFWMD STA . XPANSION TB-3 E.O.C.

Ten Most Critical. C:TB-3ECW.PLT By: Braulio Grajales 2/03/2005 11:45am



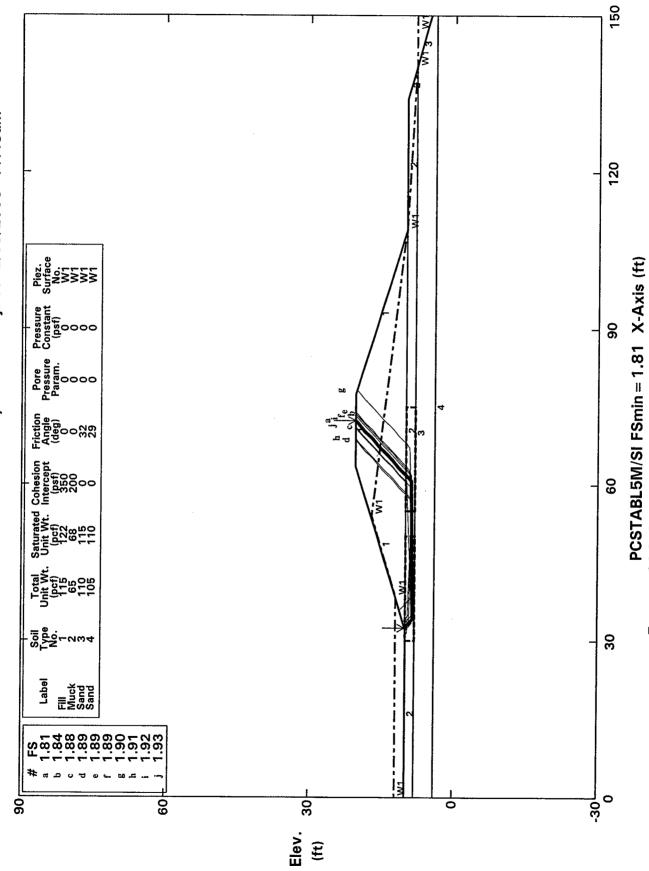
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Ten Most Critical. C:TB-3RD.PLT By: Braulio Grajales 2/03/2005 11:47am



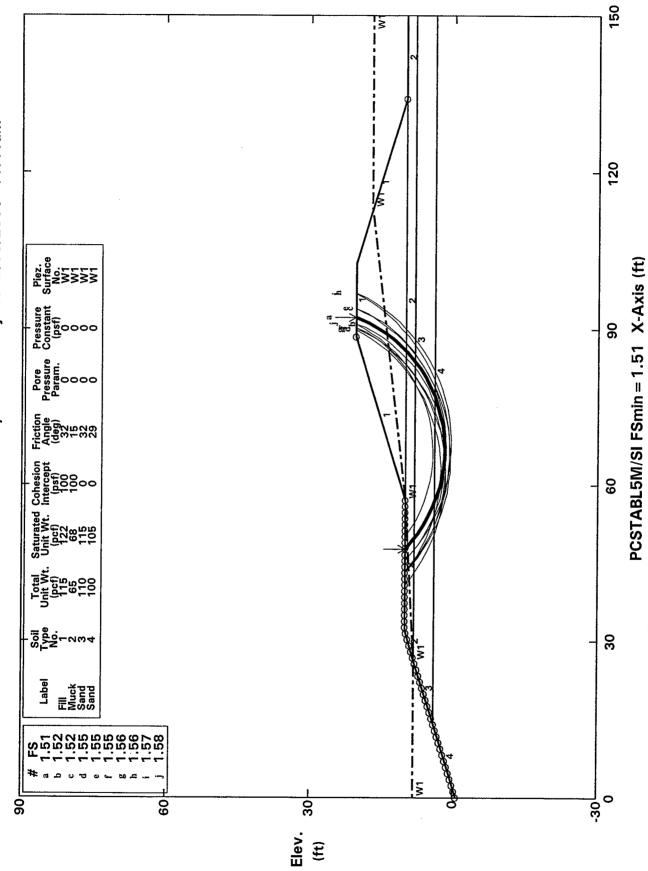
SFWIND STA EXPANSION TB-3 R.D.

Ten Most Critical. C:TB-3RDW.PLT By: Braulio Grajales 2/03/2005 11:49am



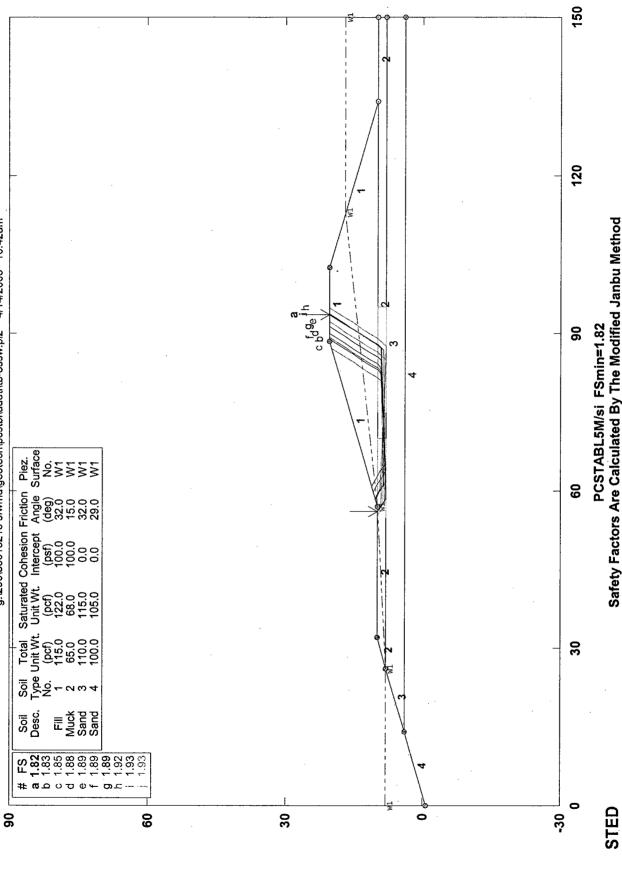
SFWMD STA EXPANSION TB-3 S.S.

Ten Most Critical. C:TB-3SS.PLT By: Braulio Grajales 2/03/2005 11:41am



SFWMD STA 5 EXPANSION TB-3 S.S.

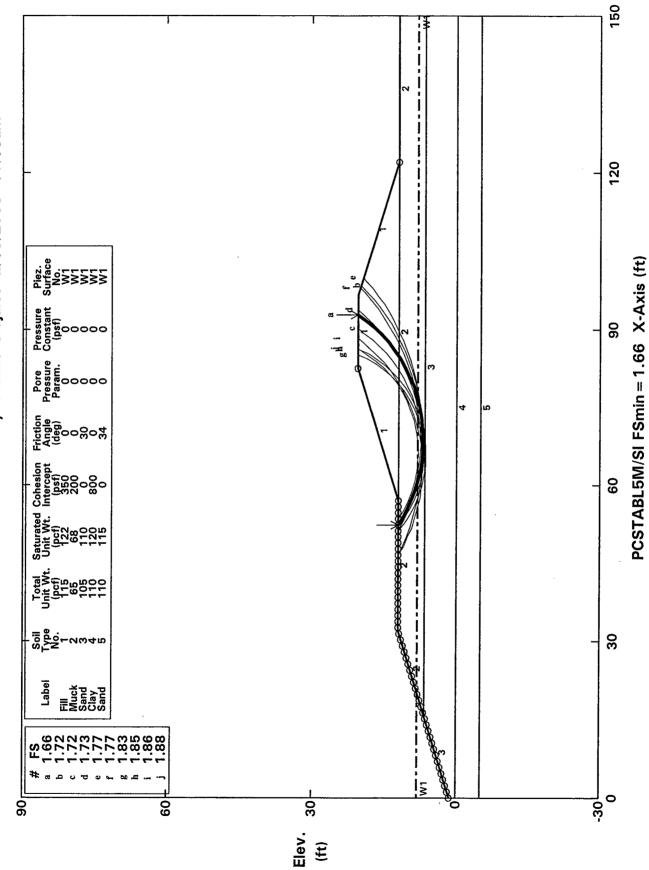
g:\296\38615215 sfwmd\geotech\pcstb\laddtl\tb-3ssw.pl2 4/14/2005 10:42am





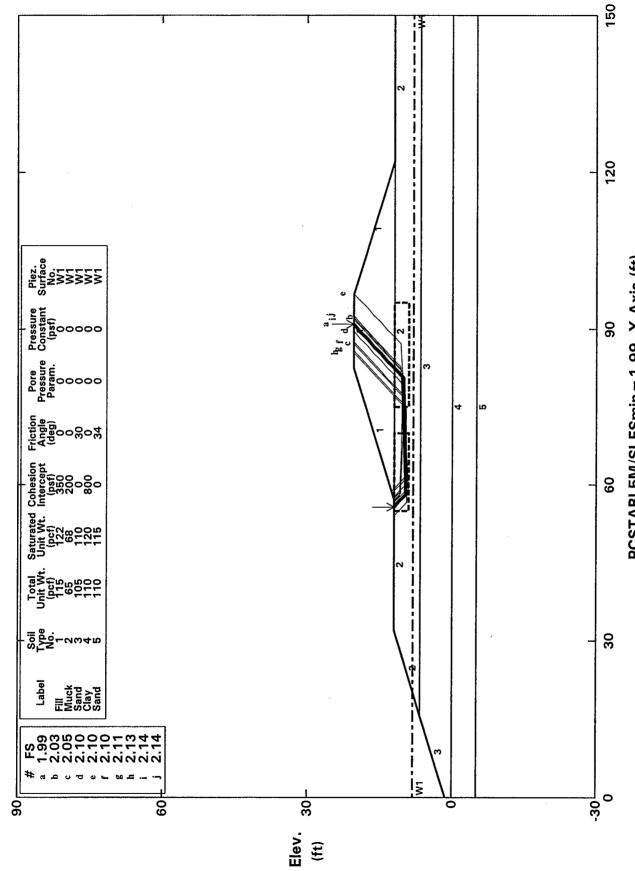
SFWMD STA 5 XPANSION TB-21 E.O.C.

Ten Most Critical. C:TB-21EC.PLT By: Braulio Grajales 2/03/2005 11:08am



SFWMD STA! (PANSION TB-21 E.O.C.

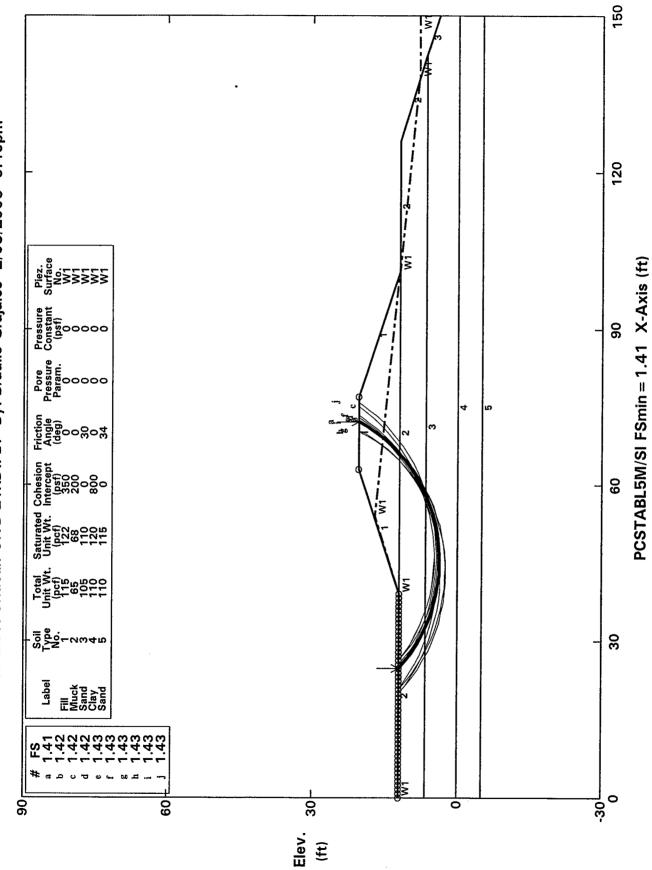
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PCSTABL5M/SI FSmin = 1.99 X-Axis (ft)
Factors Of Safety Calculated By The Modified Janbu Method

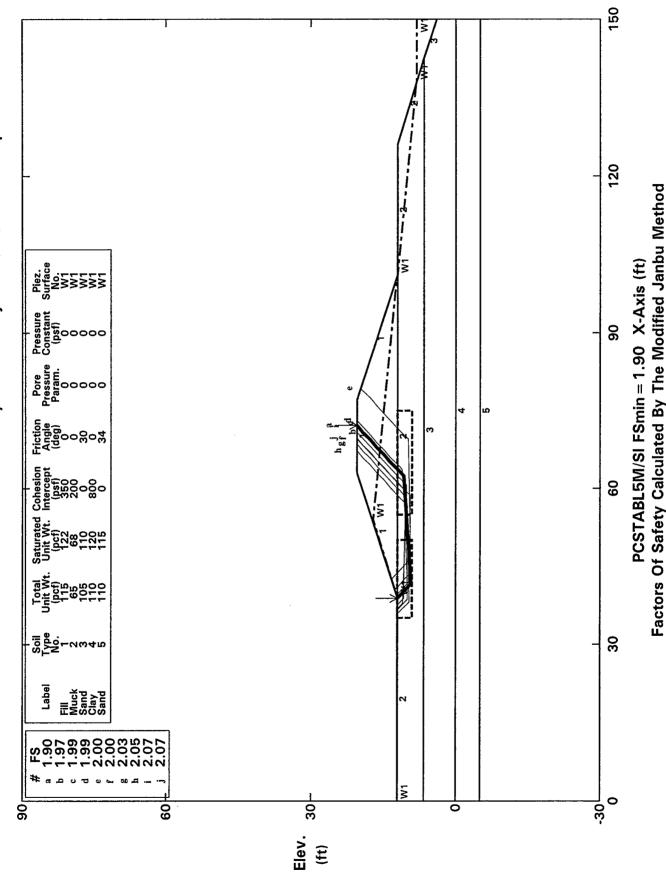
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Ten Most Critical. C:TB-21RD.PLT By: Braulio Grajales 2/03/2005 6:40pm



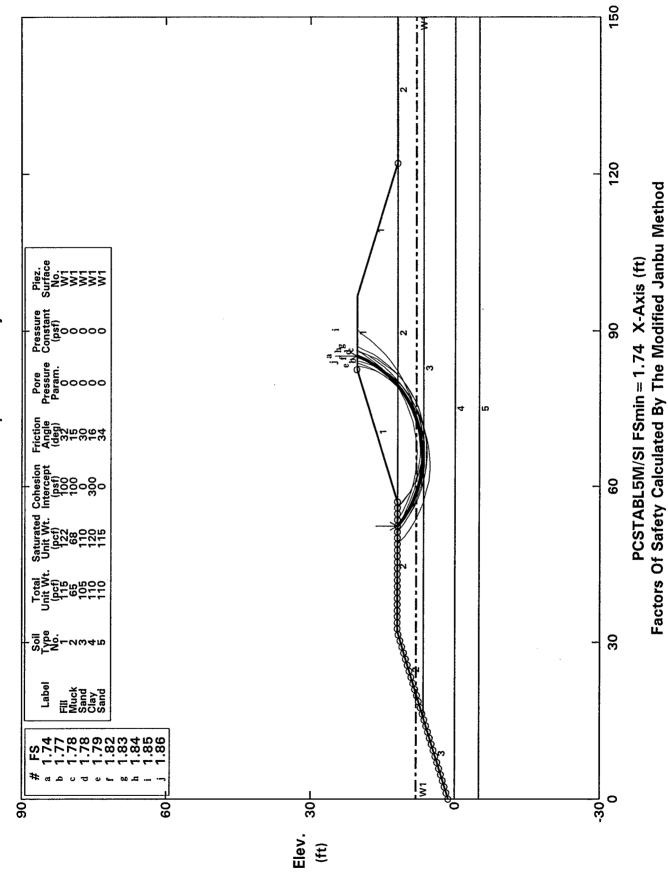
SFWMD STA XXPANSION TB-21 R.D.

Ten Most Critical. C:TB-21RDW.PLT By: Braulio Grajales 2/03/2005 6:41pm



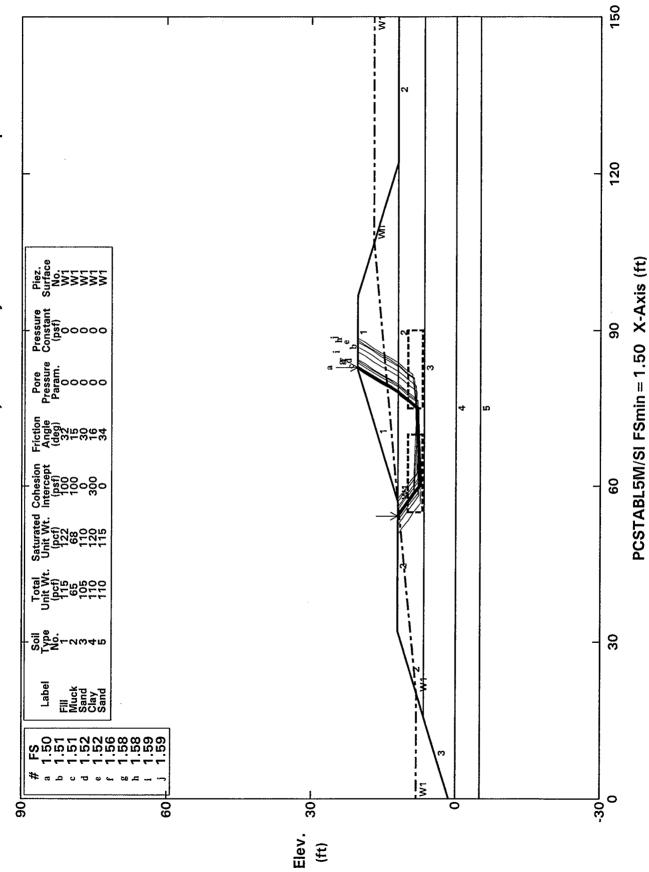
SFWMD STA XXPANSION TB-21 S.S.

Ten Most Critical. C:TB-21SS.PLT By: Braulio Grajales 2/03/2005 11:52am



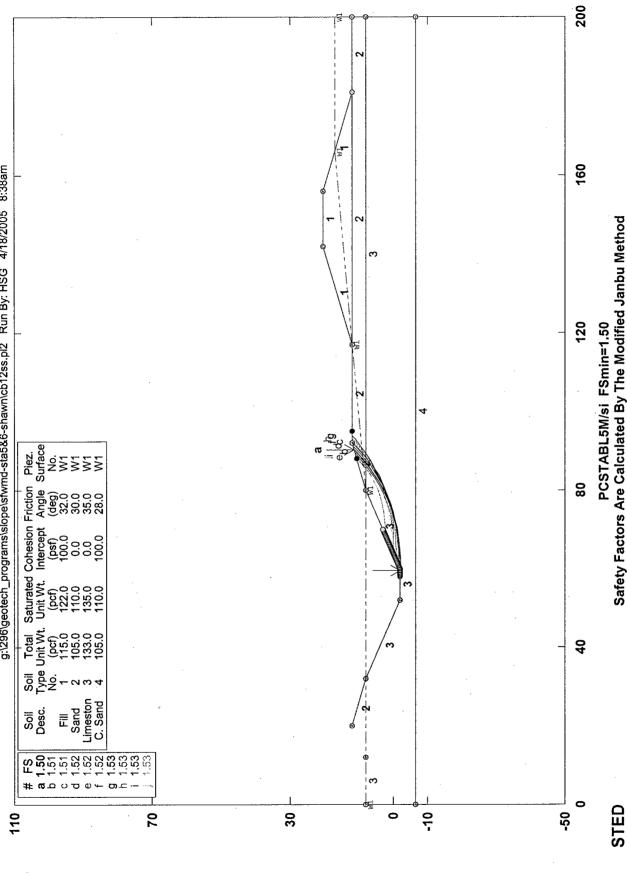
SFWIND STA :XPANSION TB-21 S.S.

Ten Most Critical. C:TB-21SSW.PLT By: Braulio Grajales 4/14/2005 4:38pm



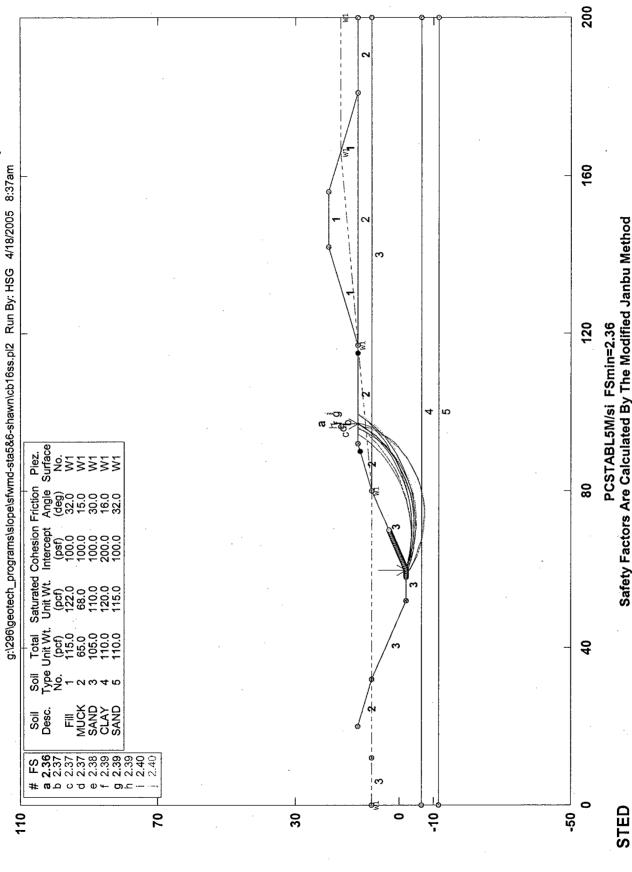
SFWMD STA 5 EXPANSION CB-12 S.S. canal with 3:1 and 2:1 slope

g:\296\geotech_programs\slope\sfwmd-sta5&6-shawn\cb12ss.pl2 Run By: HSG 4/18/2005 8:38am





SFWMD STA 5 EXPANSION CB-16 S.S. canal with 3:1 and 2:1 slope





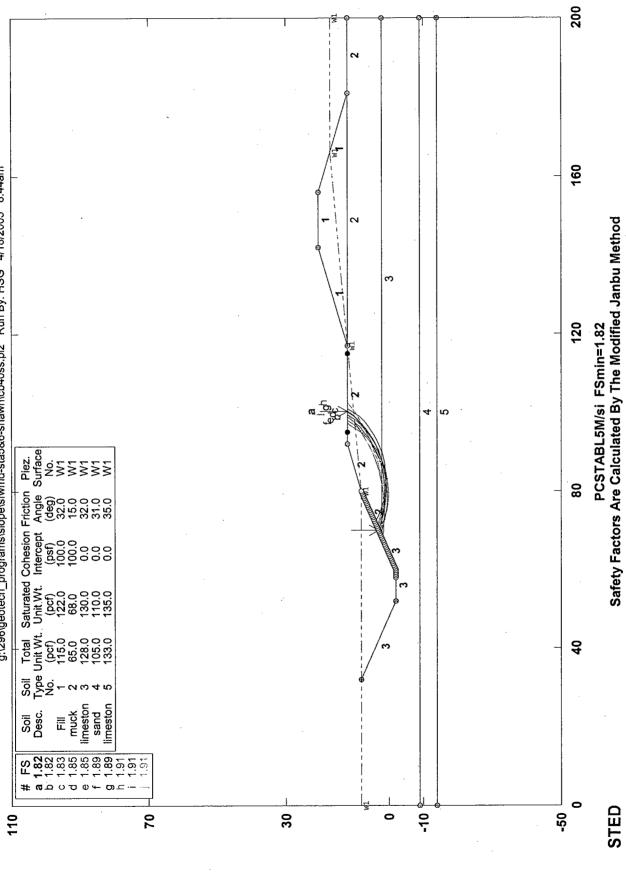
SFWMD STA 5 EXPANSION CB-33 S.S. canal with 3:1 and 2:1 slope

200 160 g:\296\geotech_programs\slope\sfwmd-sta5&6-shawn\cb33ss.pl2 Run By: HSG 4/18/2005 8:43am Safety Factors Are Calculated By The Modified Janbu Method ß 120 PCSTABL5M/si FSmin=2.34 8 Saturated Cohesion Friction Unit Wt. Intercept Angle 6 sand SAND sand SAND STED 20 30 ? -20



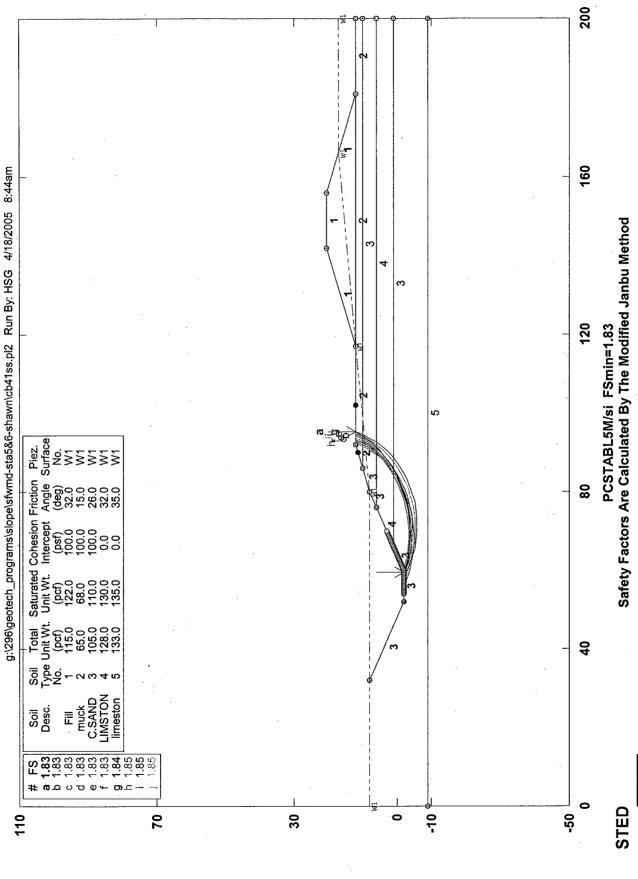
SFWMD STA 6 EXPANSION CB-40 S.S. canal with 3:1 and 2:1 slope

g:\296\geotech_programs\slope\sfwmd-sta5&6-shawn\cb40ss.pl2 Run By: HSG 4/18/2005 8:44am





SFWMD STA 6 EXPANSION CB-41 S.S. canal with 3:1 and 2:1 slope



SFWMD STA 6 EXPANSION CB-42 S.S. canal with 3:1 and 2:1 slope

g:\296\geotech_programs\slope\sfwmd-sta5&6-shawn\cb42ss.pl2 Run By: HSG 4/18/2005 8:45am വ Total nit Wt. Fill muck C. SAND IMESTON <u>۔</u> 20 30 110 0



PCSTABL5M/si FSmin=1.93
Safety Factors Are Calculated By The Modified Janbu Method

200

160

120

80

40

-20

SFWMD STA 6 EXPANSION CB-43 S.S. canal with 3:1 and 2:1 slope

160 g:\296\geotech_programs\slope\sfwmd-sta5&6-shawn\cb43ss.pl2 Run By: HSG 4/18/2005 8:45am Safety Factors Are Calculated By The Modified Janbu Method 120 PCSTABL5M/si FSmin=1.39 Saturated Cohesion Friction F t. Unit Wt. Intercept Angle Su (pct) (pst) (deg) 122.0 100.0 32.0 115.0 100.0 28.0 130.0 0.0 32.0 110.0 0.0 34.0 80 6 sand ≘ Say STED 20 30 - 20



200

SFWMD STA 6 EXPANSION CB-44 S.S. canal with 3:1 and 2:1 slope

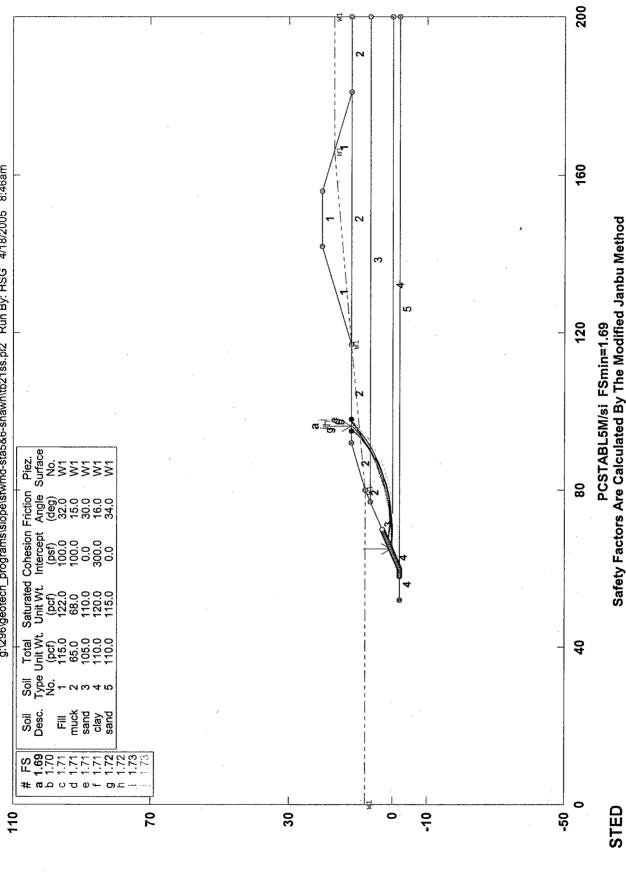
160 g:\296\geotech_programs\slope\sfwmd-sta5&6-shawn\cb44ss.pl2 Run By: HSG 4/18/2005 8:46am Safety Factors Are Calculated By The Modified Janbu Method 120 PCSTABL5M/si FSmin=1.43 Saturated Cohesion Friction F t. Unit Wt. Intercept Angle SI (pcf) (psf) (deg) 122.0 (100.0 32.0 110.0 0.0 32.0 130.0 0.0 38.0 80 40 limeston limeston STED ÷ 20 30 -50 110



200

SFWMD STA 5 EXPANSION TB-21 S.S. canal with 3:1 and 2:1 slope

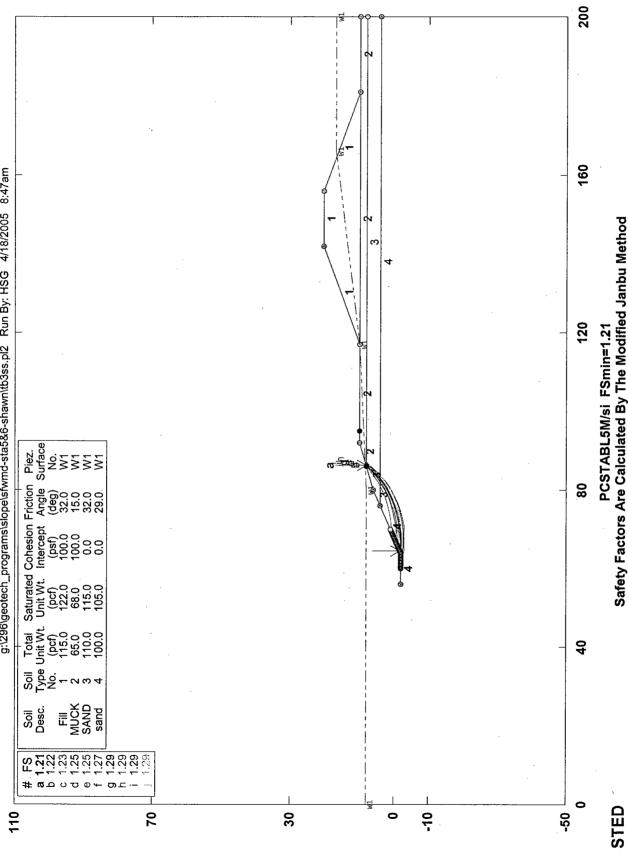
g:\296\geotech_programs\slope\sfwmd-sta5&6-shawn\tb21ss.pi2 Run By: HSG 4/18/2005 8:46am





SFWMD STA 5 EXPANSION TB-3 S.S. canal with 3:1 and 2:1 slope

g:\296\geotech_programs\slope\sfwmd-sta5&6-shawn\tb3ss.pl2 Run By: HSG 4/18/2005 8:47am





South Florida Water Management District Contract CN040936-W005, STA-5 Flow-way 3 Basis of Design Report

APPENDIX F

MUCK PROBE DATA

URS

7.7 MATCHLINE ပ 6.1 • 0.5 G.O ° 3'52 96.0 • 140 G.f 1.25 2.6 Z.3 E. F OS FOI Ľ0 , 6.0 " L'0 . **8**0 ; 9.0 9'0 8.0 8.0 2,1 3,4 1,5 1,2 G.I 2.5 8'L 8'L ĽΙ 91 6.1 MATCHLINE 1.2 MATCHLINE

S-3 SHEET 01

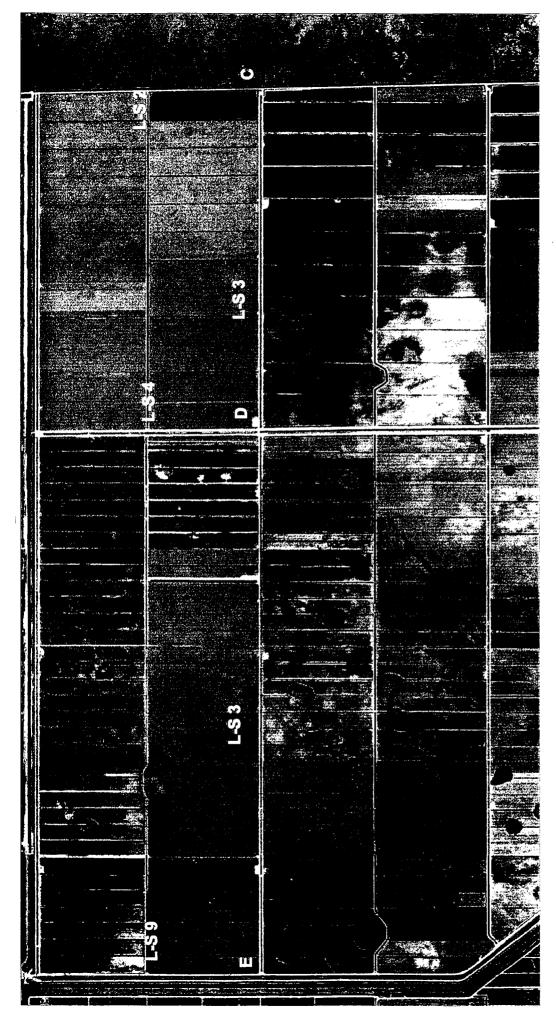
7800 CONGRESS AVENUE, SUITE 200 BOCA RATON, FLORIDA, 35497-1350 PHONE (561) 564-650 FAXE (561) 584-650 CERT, OF AUTHORIZATION NO. 1213

Scale: 1"=400'

MATCHLINE **MATCHLINE** 1.3 8.0 TITLE: S-3 SHEET 02 6.0 0 9'0 E'0. 6.0 6.0 *L*'0 8.0 6,0 6.0 6.0 8.0 7.0 6,0 9.0 L'O 6.0 7.0 3.0 7.0 €.1 €.0 T.0

THO CONCRESS AVENUE, SUITE DO BOCK, ANTING TODION, SAWAT 1580 PHONE (1991) 1884-500 CERT, OF AUTHORIZATION HO, 1913

Scale: 1"=400'

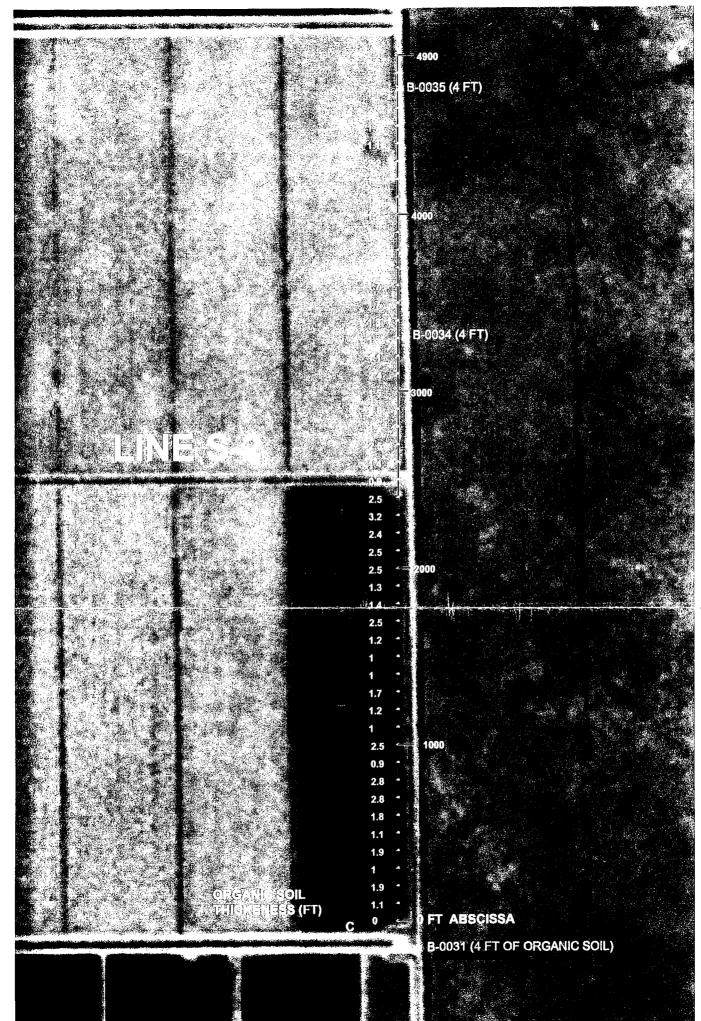


7800 CONGRESS AVENUE, SUITE 200 BOCA RATON, FLORIDA 33487 -1350 PHONIE; (581) 894-6850 FAX: (581) 894-6854 CERT. OF AUTHORIZATION NO. 1213

TITLE: L-S LABELS

N.T.S





INES-9

ABSCIBSA (FT)

ORGANIC SOIL

0 0

0

050

0

0

0 0

0

0

THICKNESS (TE)